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ABSTRACT

The supply-demand imbalance in teacher education is described and a theory of institutional response to the general imbalance problem is discussed. The theory postulates that as market demand for new graduates in a given field declines, the quality of the student body entering that field of study will also decline. The theory assumes the institutions adapt by selecting the best from a shrinking pool of talent but in so doing sacrifice absolute standards for relative standards. The applications, acceptances, registrations and SAT verbal and motor scores of three schools of engineering are compared. Eleven programs of teacher preparation were examined. Entry level test scores, applications, acceptances, and enrollments were available from ten of the programs relative to other academic divisions within the same institutions. In the cases examined, falling applications have stimulated an increase in the ratio of acceptances and a decline in mean SAT verbal and math scores among entering students, relative to other fields not in decline and relative to general test score declines. An examination of Graduate Record Examination test scores on verbal and quantitative sections by those who indicate a field of intended study show a parallel pattern. (Author/MLF)

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EDUCATORS IN SUPPLY AND DEMAND:
EFFECTS ON QUALITY

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TABLE OF CONTENTS

<u>SECTIONS</u>	<u>PAGE</u>
LIST OF TABLES	111
LIST OF FIGURES.	v
INTRODUCTION	1
I. TEACHER SUPPLY AND DEMAND.	2
Teachers and the Age Dependent System	2
Future Expansion of the Schooling System	4
School-aged Population	4
School Enrollment	5
Student-teacher Ratio	7
Dropout Rate	8
Preprimary Education	9
Expanded School Year	10
Supplementary Education.	10
The Declining Need for Teachers	11
Oversupply of Teachers	11
The Surplus	14
Demand.	17
Summary	21
Shortages Ahead?	23
II. IMPACT	25
Consequences for Teachers and Teaching.	25
The Ripple Effect	26
Lag in Response.	28
Policy Response.	29
Graduate Level Responses	30
Response by the Profession.	31
Quality	32
Collapse of the College Market.	35
The Signal.	36
Response of Institutions	39
Adaptation.	41
Engineering	42
Education	44
Teachers Colleges	47
Graduate Programs	47
CONCLUSIONS.	49
NOTES	53
APPENDICES	57
BIBLIOGRAPHY	64

LIST OF TABLES

<u>TABLE</u>		<u>PAGE</u>
1.	Size of the Population 5-13 Years Old, 1940-1984	6
2.	Size of the Population 14-17 Compared with the Enrollment in Public School, 1940-1984	7
3.	First-Time Degree Credit Enrollment and Bachelor's Degrees Awarded in All Fields and in Education Four Years Later, 1963-1970	15
4.	Bachelor's Degrees Awarded as a Percentage of Those Indicating an Education Major Four Years Earlier and as a Percentage of All Bachelor's Degrees Awarded, 1970-71 - 1974-75.	16
5.	Estimate of the Teacher Surplus Based on Two Assumptions of Demand and All Eligible as a Definition of Supply, 1969-1975	18
6.	Estimate of the Teacher Surplus Based on Two Assumptions and Corrected for "Job Seeking"	19
7.	Estimate of the Teacher Surplus Based on Two Assumptions of Demand and Using Bachelor's Degrees in Education as a Definition of Supply, 1971-1975	20
8.	Pennsylvania Education Graduates Placed in Teaching Positions, 1963-69	22
9.	Ratio of Acceptances to Applications, and SAT Scores in Three Engineering Schools, 1969-1975	43
10.	Teachers Colleges SAT Scores for All Entering Freshmen Compared to Elementary Education Freshmen and National Average, 1970-1975	45
11.	Ratio of Acceptances to Applications, and SAT Scores in Two Schools of Education, 1969-1975	46
12.	Three Academic Divisions Within One University, Comparison of Ratio of Acceptances, Applications, Enrollments, and Test Scores	48
13.	National Sample of Males and Females Indicating a BA+ Degree Preferences or Undecided, Mean SATVM Cumulative Scores within First Field of Choice for College Curriculum, Round I, 1975 and 1976, CEB	App.

TABLE

	<u>PAGE</u>
14. Intended Fields of Study, Seniors in High School. National Sample CEEB, 1972-1976	App.
15. National Sample, GRE Verbal and Quantitative Test Scores for Students Who Indicated a Field of Study, 1970-1975	App.

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
1.	Applications, acceptances, registrations (converted numbers) of entering freshmen in a college of engineering (I), 1908-1975. Source: Restricted.	App.
2.	Mean SAT verbal and mathematics scores of entering freshmen in a college of engineering (I), 1968-1975. Source: Restricted	App.
3.	National BS degree enrollments of first year engineering students, 1964-1976. Source: Freeman (1976).	App.
4.	Applications, acceptances, registrations (converted numbers) of entering freshmen in a second college of engineering (II), 1969-1976. Source: Restricted.	App.
5.	Median SAT verbal and mathematics scores of entering freshmen in a college of engineering (II), 1969-1976. Source: Restricted	App.
6.	Applications, acceptances, registrations of entering freshmen (converted numbers) in a third college of engineering (III), 1968-1975. Source: Restricted.	App.
7.	Mean SAT verbal and mathematics scores of entering freshmen in a third college of engineering (III), 1968-1975. Source: Restricted	App.
8.	Ratio of acceptances to applications in three schools of engineering, 1969-1975	App.
9.	Applications, acceptances, registrations (converted numbers) in a university teacher preparation program (I), 1968-1975. Source: Restricted	App.
10.	Mean SAT verbal and mathematics scores of entering freshmen in a university teacher preparation program (I), 1968-1975. Source: Restricted	App.
11.	Applications, acceptances, registrations (converted numbers) in a second university teacher preparation program (II), 1969-1976. Source: Restricted	App.
12.	Median SAT verbal and mathematics scores of entering freshmen in a university teacher preparation program (II), 1969-1976. Source: Restricted	App.

FIGURE

PAGE

13.	Ratio of acceptances to applications in two schools of education, 1969-1974	App.
14.	Applications, acceptances, registrations in a college of business administration (converted numbers), 1968-1975. Source: Restricted	App.
15.	Mean SAT verbal and mathematics scores of entering freshmen in a college of business administration, 1968-1975. Source: Restricted	App.
16.	Applications, acceptances, registrations in a college of arts and science (converted numbers), 1968-1975. Source: Restricted	App.
17.	Mean SAT verbal and mathematics scores of entering freshmen in a college of arts and science, 1968-1975. Source: Restricted	App.
18.	Applications, acceptances, registrations (converted numbers) in a college of allied health, 1968-1975. Source: Restricted	App.
19.	Mean SAT verbal and mathematics scores of entering freshmen in a school of allied health, 1968-1975. Source: Restricted	App.
20.	Elementary education, freshmen enrollments in eight teachers colleges, 1971-1975 (1970 enrollments = 1.0). Source: Restricted	App.
21.	Mean SAT verbal and mathematics of entering freshmen in elementary education in eight teachers colleges, 1971-1985 (1970 scores = 1.0). Source: Restricted	App.
22.	Ratios of acceptances to applications in elementary education in eight teachers colleges, 1970-1973. Source: Restricted	App.
23.	Applications for nursing (RN) in four of the eight teachers colleges, 1971-1973 (1970 application = 1.0). Source: Restricted	App.
24.	Freshman enrollments in nursing (RN) in four of the eight teachers colleges, 1971-1973 (1970 enrollments = 1.0	App.

FIGURE

	<u>PAGE</u>
25. Ratio of acceptances to applications in nursing (RN) in four of the eight teachers colleges, 1970-1973.	App.
26. Mean SAT verbal and mathematics scores of entering freshmen in nursing (RN) in four of the eight teachers colleges, 1971-1975 (1970 scores = 1.0)	App.
27. Enrollments in early childhood education in six of the eight teachers colleges, 1971-1975 (1970 enrollment = 1.0). Source: Restricted.	App.
28. Mean SAT verbal and mathematics scores for entering freshmen in early childhood education in six of the eight teachers colleges, 1971-1975 (1970 scores = 1.0)	App.
29. Ratio of acceptances to applications in early childhood education in six of the eight teachers colleges, 1971-1975 (1970 scores = 1.0) Source: Restricted	App.
30. Mean GRE verbal test scores for national sample of test takers designating selected academic fields (1970 scores = 1.0), 1971-1975	App.
31. Mean GRE quantitative test scores for national sample of test takers designating selected academic fields (1970 scores = 1.0), 1971-1975	App.

INTRODUCTION

The reader will find here two papers: One describing the supply-demand imbalance in teacher education, and the other discussing a theory of institutional response to the general imbalance problem. The reader familiar with teacher oversupply may want to turn to the response problem. The theory postulates that as market demand for new graduates in a given field declines, the quality of the student body entering that field of study will also decline. The theory assumes the institutions adapt by selecting the best from a shrinking pool of talent but in so doing sacrifice absolute standards for relative standards. In the cases examined, falling applications have stimulated an increase in the ratio of acceptances, and a decline in mean SAT verbal and math scores among entering students, relative to other fields not in decline and relative to general test score declines. An examination of Graduate Record Examination test scores on verbal and quantitative sections by those who indicate a field of intended study show a strikingly parallel pattern.

TEACHER SUPPLY AND DEMAND

Teachers and the Age Dependent System

Central to any consideration of the future production of teachers is the manner in which school populations expand and contract. It is central because the most important factor in determining the demand for teachers is the supply and composition of the school-age population. When that population expands, the schools expand and the demand for teachers increases. When that population contracts, the supply of students decreases and the demand for teachers declines. Since the mid-19th century and throughout the first two-thirds of this century, the school-age population (5-17 year olds) has constantly grown (except for the depression years) from 12 million in 1870 to a peak of 52.7 million in 1969.¹ The teacher force has also steadily risen from 423,062 in 1900 to a peak of 2,061,115 in 1970. It is interesting to note that during the Great Depression there was an actual net loss in the number of 5-17 year olds in the population - a decline of 766,063 between 1930 and 1940. But school enrollment declined much less (244,473) and average daily attendance actually rose. As a result the teacher force did not decline, but in fact rose by slightly over 20,000 during the decade 1930 to 1940.

The actual supply of students, as distinguished from the school-age population, is thus dependent upon the percentage of the 5-17 year olds enrolled in and attending school at any given time. Enrollment and attendance tend to vary with economic and social conditions such as level of parental education, family income, and type and location of community, as well as grade level of schooling. Nonetheless, up to grade nine, practically every child is enrolled in and completes the prescribed course of studies regardless of these factors. But after grade nine, enrollment begins to decline as does attendance. For instance, in 1970, 99.2% of 16-17 year olds enrolled had declined to 90.0%. From 1870 to 1968 the percentage of 5 to 17 year olds enrolled in school rose from

57.0% to 85.1%. Average daily attendance, of course, will reflect some constant attrition from school at a point below the percentage enrolled, regardless of grade level. In 1870, the percentage of 5-17 year olds in attendance daily was 33.8%. By 1968 school hooky had been greatly reduced. By then 79.1% of the 15-17 year olds were in average daily attendance.

The dependency of teacher demand on student supply is so critical that nearly every school superintendent in the United States attempts to project enrollments and teacher hiring needs based upon his best estimate of population growth or decline in the area served. Some school districts use more sophisticated projection methods than others, but, nonetheless, the need for teachers in all school districts is determined primarily by the size of the school-age population currently enrolled and in attendance. Thus, it is perfectly obvious why the concern regarding teacher surpluses has arisen at a time when (a) it is clear that the school-age population has, for the nation as a whole, begun to decline and, (b) at the same time, growth in the percentage of that population enrolled and attending school has begun to reach an upper limit (see Tables 1 and 2).

Growth in the 5-17 year old population, accompanied by rising levels in enrollment and attendance, has stimulated a constantly rising demand for teachers for a century, although that condition reflects no particular philosophy or theory of education. It reflects rather two peculiarities of the schooling system. First, we have come to believe it is not feasible for mass education to occur outside of a universal, compulsory system of public and regular non-public schools. Second, the student-teacher ratio in that system shows slight elasticity, seeming for the most part to be relatively fixed. Thus, for every incremental increase in student enrollment, a relatively fixed number of teachers and other instructional staff is hired.

Reflecting the first point, nearly all of the growth in educational demand, which effects teacher hiring, occurs in public and regular non-public schools. This is a crucial point because, overall, the demand for all forms of education and learning is not satisfied by the schools alone.

Organized learning outside of schools has grown very rapidly since World War II and in all likelihood will continue to grow.² Yet, that growth has had little if any effect on the demand and supply of teachers. As a consequence, the overall demand for education and learning continues to rise, while the demand for school teachers declines - reflecting simply a contraction of the school-age population. (I will return to this point later.)

To turn for a moment to the point about student-teacher ratio, the aggregate change in instructional staff per 1,000 enrolled pupils has gradually risen to an average annual rate of approximately 0.7% since 1930.³ In 1930 the ratio was 34.3 per 1,000 pupils or approximately 29 students per instructional staff member. In 1968 the ratio had risen to 47.2 per 1,000 pupils or approximately 21 students per instructional staff. The ratio of teachers per pupils, as distinguished from instructional staff per pupils, is slightly different. For instance, the number of pupils per teacher in elementary schools is expected to decline from 28.4 in 1960 to 22.7 in 1980. The secondary pupils per teacher is expected to decline from 21.7 in 1960 to 18.9 in 1980. More is said below about student-teacher ratio.

Future Expansion of the Schooling System

What are the variables, within the context of the present schooling system, that might alter demand for teachers? The possibilities that come immediately to mind fall into seven categories: (1) change in school-age population; (2) change in enrollment; (3) change in student-teacher ratio; (4) further reduction of the dropout rate (now about 20%); (5) downward expansion into mass pre-primary education; (6) expanded school year; and (7) expansion of supplementary education.

School-aged Population

Assuming that 5-13 year olds and 14-17 year olds serve as a proxy for the school-aged population, those two groups increased from 33.4 to 37.7 million and 12.1 to 16.3 million respectively between 1961 and 1971.

The 5-13 year olds peaked in 1968 and have actually declined in absolute numbers since then. The projected percentage change for the 5-13 year olds between 1971 and 1981 is a decline of 2%, reaching a level of 34.9 million in 1981. The greatest decline year will be 1976 when about 32.5 million 5-13 year olds are projected in the overall population: a loss of approximately 1 million from 1971 (see Table 1 below).

The 14-17 year olds are expected to decline in numbers by about 10% between 1971 and 1981. The projected number of 14-17 year olds in the population by 1981 is projected at 14.7 million: a loss of approximately 1.6 million from 1971 (see Table 2 below).

The adjustment problem for the schools has been made even more difficult by the rapid expansion of these cohorts in the prior decade. From 1961 to 1971 the 14-17 year olds increased in numbers by 34%, and the 5-13 year olds by 7% (much greater expansion occurred for this group in the prior decade). At the very time when expansion of staff and facilities have just begun to catch up with an expanding population, that population has begun to decline, leaving in its wake excess capacity and a lag in the still expanding rate of teacher production.

School Enrollment

Even though population changes are expected to reduce the demand for teachers over this decade, as was pointed out above, the percentage of the 5-17 year olds actually enrolled in and attending school will be the critical factor. At the elementary level, nearly every child is currently enrolled. Thus, the decline in enrollment will equal the decline in population. However, at the high school level, some elasticity exists because all 14-17 year olds who theoretically could be enrolled are not enrolled. Enrolling them still constitutes an area of potential policy action. The federal government's projection assumes that policy action in this area will result in reducing the numbers of 14-17 year olds who are not enrolled. Thus, the projected decline in enrollment between 1971 and 1981 is less than the projected population decline. The discrepancy assumes that some of the 14-17 year olds who would not ordinarily be accommodated by the

schools now will be. The projected decline in enrollment by 1981 is 5%, as opposed to a projected 10% decline in the actual population.

Nonetheless, by 1981 approximately 1.7 million school seats will be empty as compared to 1971. Based on projected student-teacher ratios, those empty seats represent a loss of about 83,000 teaching jobs. Tables 1 and 2 below show the size of the school-age populations, 5-13 year olds and 14-17 year olds, from 1940 to 1984, together with enrollments, and projected enrollments.⁴

Table 1

Size of the Population 5-13 Years Old, 1940-1984

Year	Population ¹	Public School Enrollment ^{2,3}	Ratio
1940	24,118,000	18,832,000	.780
1950	24,089,000	19,387,000	.804
1960	32,556,000	27,602,000	.847
1965	35,877,000	30,563,000	.851
1970	36,484,000	32,577,000	.892
1975	33,300,000	30,400,000	.912
1980*	30,964,000	27,900,000	.924
1984*	30,213,000	28,500,000	.943

*Estimated figures (Series II Assumptions, U.S. Bureau of Census).

¹USOE, NCES. Projection of Educational Statistics, Table B.1, p. 153, and P. Morrison (1976), p. 14.

²USOE, NCES. Digest of Educational Statistics, Table 3, p. 7 (years 1940, 1950, 1960).

³USOE, NCES. Projection of Educational Statistics to 1984-85, Table 3, p. 18 (years 1965-1985).

Table 2

Size of the Population 14-17 Compared with
the Enrollment in Public School, 1940-1984

Year	Population ^{1,2}	Public School Enrollment ^{1,2}	Ratio
1940	9,720,409	6,635,337	.682
1950	8,404,768	5,757,810	.685
1960	11,154,879	8,531,454	.765
1965	14,145,000	11,657,808	.824
1969	15,550,000	13,084,301	.841
1975*	16,902,000	14,300,000	.846
1980*	15,608,000	13,400,000	.858
1984*	14,279,000	12,100,000	.847

*Estimated figures.

¹USOE, NCES. Digest of Educational Statistics, 1975 Edition, Table 30, p. 37 (years 1940-1969).

²USOE, NCES. Projection of Educational Statistics to 1984-85, Table 3, p. 18 (Enrollments grades 9-12); Table B.2, Projection of High School-age Population, p. 154.

Student-teacher Ratio

Student-teacher ratio might be reduced at a faster rate than the above mentioned historical rate. That seems unlikely given a history of change which seemed to have ignored such factors as the depression, World War II, the Korean War, Sputnik, and the ensuing education crisis, television and other major electronic communication changes, Vietnam and the changing values and social upheaval of the sixties, and the growing numbers of marginal learners in the schools throughout the 1950's and 1960's. The key factor now may be the willingness of school boards and superintendents to sacrifice higher student-teacher ratios in order to maintain other services in light of budget crunches. The Elementary-Secondary Education Act has had some short-term effect (not clearly determined) on

the historical ratio, but ESEA funds cannot be counted on to significantly alter student-teacher ratio during the next four years, or, at the very most, ESEA will be less a factor during the next five years than during the 1960's when funds took a one-time leap.

Dropout Rate

Continued growth in the percentage of students who complete 12 years of schooling would act as a stimulant to teacher demand. The historical growth rate in the percentage of first grade entrants who subsequently become twelfth grade graduates has been startling in this country. Since 1900, when less than 6% of the potential graduates actually completed 12 years of schooling, the percentage of successful school completion had risen to approximately 82% in 1972 (Byrnes and Folk, 1970). However, the very nature of that growth suggests a slowing effect must eventually set in, and there is evidence such a slowing will characterize the 1970's and 1980's. Byrnes and Tussing (1971) project that it will take 20 years to raise the school success rate to 90%. That represents a rate of growth slower than any other during this century, except a brief time during World War II. Assuming a 0.5% increase in the school-age population completing 12 years of school rather than dropping out prior to graduation, that rate of increase would add approximately 207,060 students to the school enrollments above grade 9 each year during the 1970's and 1980's. Based on a student-teacher ratio of 19.8:1, that rate of growth would require approximately 10,457 new teachers per year. (Note that these figures assume a stable school population from 1970-1990 based on the 1970 enrollments.) One of the major constraints in this kind of projection is the effect of competition for educational resources. Aid for the potential dropout must compete with other claims for educational dollars. The competition for those dollars is likely to intensify as the last of the baby boom population attempts to squeeze into post-secondary education. The transfer of that population to post-secondary, with its attendant needs and appetites for resources, will almost certainly negatively affect the effort on dropouts. The schools have expanded upwardly since the mid-19th century, reaching a point of near universal enrollment at all levels by

1969, ranging from 98% at grade 1 to 90% at grade 12. If new teacher demand is to result from further expansion, it appears that it would most likely occur either above grade 12, or below grade 1. My analysis elsewhere suggests that a proportional shift in resources to higher education, relative to the schools, has already taken place at this state and federal level (Weaver, 1977).

Preprimary Education

The projection data on preprimary growth are meager. Byrnes and Tussing (1971) anticipated growth in early childhood education at 0.4 years of schooling per person by 1975, suggesting that 40% would have one extra year of schooling by that time. In 1967-68, a total of 21,237 teachers were employed in all kindergartens and nursery schools. In 1970, 69.3% of all 5 year old children were already enrolled in preprimary programs. That has increased to 78.6. Only 27.8% of the 4 year olds were enrolled in 1970, suggesting that the 4 year old population constitutes a target for future school expansion during the 1970's. Assuming that by 1980 the enrollment of 4 year olds rises to 47%, and assuming a decrease in the total number of 4 year olds by approximately 500,000, that would add 113,000 additional students to the system. Assuming a student-teacher ratio of 22.7 by 1980, then approximately 4,977 new teaching positions will be needed annually. But the overall demand for preprimary teachers has a much wider base for expansion than the elementary-secondary system. For instance, in both France and Belgium a very extensive schooling system exists for children down to age two. In Belgium, 80% of the children aged two to six are enrolled in school. In France, the figure is 70.4%. It is uncommon for three year olds in the United States to be enrolled in school programs (only 19.9% in October 1974), but the schools are now in the process of expanding downwardly much as they expanded upwardly, simply reversing the sequential order. Following some point of optimum saturation of four year olds, three year olds will undoubtedly be the next target of growth, and following three year olds, the two year old toddler will become a target. Indeed, in both France and Belgium, 15% of the two year olds are now enrolled in school programs.⁵

Expanded School Year

Expanding the school year may constitute still another area of new demand. It can be assumed some teachers will not prefer year-around employment, thus creating additional demand for new teachers. This factor is perhaps the most uncertain of the five. Judging from the historical data, the length of the school year and school calendar have changed very little since 1930 - remarkably little. The average length of the school year increased from 132 days in 1869-70 to 173 days in 1929-30. Since 1930 the average length of the school term has practically remained unchanged, reaching a peak of 179 days in 1961-62. Even with talk of the so-called "45-15 Plan," or other year-around school plans, the likelihood of widespread, sudden expansion of the school year seems remote.

Supplementary Education

Intensification of efforts to teach the disadvantaged child, particularly in grades K-9, may become an important variable in school expansion. There are no particularly good estimates in this area. The major source of expansion (ESEA) is already accounted for in USOE projections of teacher-pupil ratio to 1980. The other major source, the various anti-poverty programs, is not likely to be greatly expanded in the short term. One must assume that the prospects for any major change in this area during the next several years will depend on major federal funding and that seems remote given the current federal budget commitments to elementary and secondary education and to P.L. 94-142. It has been argued elsewhere by this writer (Weaver, 1977) that increases in school resources for at least 15% of the school population defined as marginal learners can be justified at a minimum. For example, such an increase proposed by the Fleischmann Report for New York State would result in spending \$1.50 on marginal learners for each dollar spent on children not defined as marginal learners. Based on 1970 school expenditures, that would have added approximately \$2.2 billion to the national expenditures on elementary-secondary education. Translated into teaching staff, based on 1970 elementary school salaries of \$8,412.00, and assuming teachers salaries

comprise 43.5% of overall costs of school programs, then the \$2.2 billion would have hired an additional 114,122 teachers for the elementary schools. This would be an addition to the teaching force of approximately 11%. Of course these are very crude figures, and subject to numerous decisions regarding the kinds of teachers needed (probably requiring more training and thus more costly), the percentage of funds that would be used to purchase instructional materials, special facilities and equipment, and the like. For reasons of cost, low probability of success and general apathy toward or, worse yet, resistance to such efforts the prospects would seem to be remote for any new massive infusion of federal funds into compensatory education at the elementary level.⁶ More remote still is the likelihood states or local systems will greatly increase expenditures for the marginal learner. Thus, supplementary education as a potential source of new teacher demand promises little, given the present national priorities. The case of special education is subject to a separate analysis but limited data in Massachusetts (Gillis, 1976) suggest that even given the stimulus of Chapter 766 funding, the state has a surplus of special education teachers, particularly those trained to teach the moderately handicapped. The most recent NEA Research Bulletin shows that the supply, as a percentage of demand, in special education at the elementary level was 217% for beginning teachers in 1975, and 192% for beginning secondary teachers.

The Declining Need for Teachers

Oversupply of Teachers

In late July 1973, the National Education Association reported that 26 states claim a "much larger excess than one year ago" in response to queries about teacher applicants for jobs. By June 1976 the NEA reported an overall surplus of approximately 89.4% above demand for elementary and secondary teachers (NEA, 1976). The trend since 1966 is clear. Whereas in 1966, 31 out of 50 state departments of education reported either "substantial shortage of applicants" or "some shortage of applicants," in 1972 no state reported substantial shortages, nor had any state so reported

since 1969 when only two did. Only one state reported in 1972 that "some shortage of applicants" existed. Late July openings for teachers have declined in the 80 largest school districts from 7,843 in 1967 to 820 in 1972. A report from 61 large school systems shows nine qualified applicants for each open position in 1972 compared with seven applicants the year before. The NEA reports that in 1974 the Plains States had the highest percentage of graduates entering teaching jobs (57.1%) and New England states had the lowest percentage (36.5%).

As late as 1973, special education, remedial reading, industrial arts and trade areas are most frequently mentioned as likely to be filled by persons with substandard qualifications. Although math teachers have traditionally been in low supply, the number of graduates then was almost as large as the number of new teachers employed. The most recent NEA report states no field is undersupplied as of June 1976 with the possible exception of trade-vocational and industrial-technical.

Regarding areas of oversupply, states reported to the National Education Association those teaching fields in which they had surpluses of applicants for jobs in 1972 (NEA 1973):

<u>Areas</u>	<u>Number of States</u>
Social Studies	39
Language Arts	34
Health & Physical Education (men)	33
Elementary	26
Foreign Language	18
Health & Physical Education (women)	16
Home Economics	15
Business Education	14
Art	13

Some of the areas which were severely oversupplied in 1972 had shown the largest gains in new teachers from the previous years:

Areas of Increase
Over 1971 Production

	<u>Percentage Increase</u>
1. Social Studies (Economics, Sociology and Psychology)	+ 23.6
2. Special Education	+ 19.7
3. Health & Physical Education	+ 15.5
4. Distributive Education	+ 14.5
5. Speech & Drama	+ 12.3
6. Art (Secondary)	+ 11.7
7. Physics	+ 11.4
8. Industrial Arts	+ 10.9

These same fields remain today chronically oversupplied. A breakdown of the fields of study for Fall 1975 show English, Social Studies, Physical Education and Elementary Education are among those having the largest surpluses:

<u>Field of Preparation</u>	(1) <u>Estimated Supply¹</u>	(2) <u>Projected Demand</u>	(3) <u>Supply as a Percent of Demand</u>
Elementary Education	76.380	38.406	198.9%
Special Education	11.000	5.053	217.7
Physical Education (Girls)	6.050	2.393	252.8
Foreign Languages	4.826	1.897	257.0
Art	5.192	2.003	259.2
Social Sciences	17,198	4.954	347.2
Physical Education (Boys)	8.353	1.981	421.7

¹ Estimated supply is approximately 70% of the total actually prepared to teach (i.e., meeting minimum requirements for certification).

The hiring of teachers is complicated by a large pool of qualified teachers with previous experience who are currently not teaching. For instance, in Fall 1972 approximately 83,400 qualified teachers with interrupted service were interested in re-entering teaching. The number of positions expected to be filled by re-entering teachers is estimated by the National Education Association to range between 54,000 and 64,900, leaving an additional teacher surplus of 18,500 to 29,400 in 1972.⁷

What one witnesses in these data is the production of teachers from among that proportion of the population which represents this century's greatest population explosion, yet they were trained at a time when the children to be taught were born during this century's lowest birth rate.⁸ Obviously, the production of teachers must and will contract in view of this dilemma.

The Surplus

Knowing the exact dimensions of the teacher surplus is like the blind man knowing the exact dimensions of an elephant, or perhaps a stampeding herd of elephants. There is no reliable source of actual job vacancies nor is there consensus on how to estimate demand. Demand becomes a statistical artifact representing assumptions about teacher turnover, teacher-pupil ratio and enrollment. A difference of 2% or 3% in teacher turnover can produce sizeable differences in the estimate of surpluses as the figures below will reveal. The issue of supply is also a matter of debate. Unresolved is the question of who should be counted. There are several choices: (a) all who would be eligible to teach (meeting minimum course requirements for certification); (b) only those who actually apply for and receive certification from a state; (c) only those who "major" in education as a field of preparation; (d) only those who actually seek a teaching position.

The tables below suggest how each of these definitions of supply, and two widely used definitions of demand, would affect an estimate of surpluses. (There is still another manner of estimating the surplus which won't be taken up here; namely, the placement records of colleges which prepare teachers.)

The first set of tables deals with supply. Table 3 shows the total number of bachelor's degrees awarded by all institutions of higher education in the United States as a ratio of total first-time entrants four years earlier. Table 3 also shows the total number of bachelor's degrees awarded in education to total first-time degree credit enrollments four years earlier, and the ratio of education degrees to all degrees. All of these ratios are declining. Therefore, the student dropout rate in higher

education is going up, meaning that a smaller ratio of degrees are awarded to entrants four years earlier. The ratio of education degrees to entrants four years earlier is also declining, suggesting dropouts in education are roughly parallel to others. Finally, the ratio of degrees awarded in education is declining, meaning that other fields are growing relative to education. Richard Freeman (1976) shows that the proportion of high school students attending college is declining as well, suggesting that a decline in the market for teachers may be having an overall effect on the decision to attend college.

Table 3

First-Time Degree Credit Enrollment and
Bachelor's Degrees Awarded in All Fields and
in Education Four Years Later, 1963-1970

Total First-time Degree Credit Enrollments ¹		Bachelor's Degrees Awarded 4 Years Later ²		Rates of Bachelor's Degrees to Degree Credit Enrollment		Bachelor's Degrees Awarded for Education ³	Ratio of Degrees in Education & All Degrees
				4 Years Earlier	Total Education		
1963	1,046,417	1967-68	631,923	.603	.126	132,087	.209
1964	1,224,840	1968-69	728,167	.594	.121	198,554	.204
1965	1,441,822	1969-70	781,510	.548	.112	161,904	.204
1966	1,378,000	1970-71	839,730	.609	.128	176,571	.210
1967	1,439,000	1971-72	883,460	.613	.132	190,850	.216
1968	1,629,751	1972-73	922,362	.565	.119	199,210	.210
1969	1,748,655	1973-74	945,776	.540	.105	185,181	.195
1970	1,780,119	1974-75	922,933	.518	.093	166,967	.180

¹USOE, NCES. Projection of Educational Statistics to 1983-84. 1974 Edition, Table 14, p. 32.

²USOE, NCES. *Op. cit.*, Table 23, p. 49. (Note: Years 1972-73, 1973-74 and 1974-75 are corrected figures provided by V. Grant, NCES, personal communication.)

³USOE, NCES. *Op. cit.*, Table 23, p. 49. (Note: Years 1972-73, 1973-74 and 1974-75 are corrected figures provided by V. Grant, NCES, personal communication.)

Table 4 shows bachelor's degrees awarded in education as a percentage of those indicating an education major four years earlier, and as a percentage of all graduates who meet minimum requirements in education. The percentage of freshmen, indicating an education major remains a relatively steady constant with the percentage receiving bachelor's degrees in education four years later. Both are gradually declining, with the percentage receiving education degrees declining slightly ahead of the percentage indicating a major. The proportion of "majors" in education to those eligible to teach has increased gradually since 1970-71, perhaps indicating a trend toward fewer acquiring an education certificate under minimum conditions. (The State Education Department in Pennsylvania suggests such a trend is observable in that state.) Finally, it turns out that the proportion graduating in education compared to those entering four years earlier is falling (mirroring the tendency in all fields, per Table 3).

Table 4.

Bachelor's Degrees Awarded as a Percentage of
Those Indicating an Education Major Four Years Earlier and
as a Percentage of All Bachelor's Degrees Awarded,
1970-71 - 1974-75

Percentage of Freshmen Indicating Elementary or Secondary Education as a Major ¹			Bachelor's Degree Awarded in Education 4 Years Later ²		Percentage of Bachelor's Degrees in Education of All Bachelor's Degrees and Total Eligible for Certification		Bachelor's Degree Awarded in Educa- tion as a Percentag e of Freshmen, Indi- cating Education 4 Years Earlier
Year	Percent	Totals	Year	Totals	Eligibles	All BA's	
1966	21.7	299,026	1970-71	176,571	.563	21.0	.590
1967	22.4	322,336	1971-72	190,850	.601	21.6	.592
1968	23.5	382,991	1972-73	194,210	.620	21.0	.507
1969	22.1	386,452	1973-74	185,181	.663	19.5	.479
1970	19.3	343,562	1974-75	166,967	.701	18.0	.485
1971	15.4	271,906					
1972	12.1	210,592					
1973	8.8	154,603					

¹ American Council on Education, The American Freshman. National Norms.
 Annual Report for 1966-73.

² USOE, NCES. Projections of Educational Statistics to 1983-84, 1974
 Edition, Table 14, p. 32.

If the supply of teachers were to be taken as those who major in education, the figures just about equal the proportion the NEA estimates seek jobs annually. That figure would be approximately 71% based on the market 1952-1968. In 1974-75 the degrees awarded to education majors represented 70.1% of all graduates eligible to teach.

Demand

The major variable in estimating demand is the assumed rate of turnover. Carroll (1974) argues that the NCES estimates in Table 29, Projections of Educational Statistics, understate turnover, in effect, by leaving out an estimate of attrition of classroom teachers who go into administration or non-teaching professional positions. NCES, on the other hand, believes it has overstated turnover, particularly as the market has tightened and is now preparing a new set of estimates.⁹ The current figure used at NCES, subject to revision, is 7.8% of the previous years demand for classroom teachers. The NEA uses a figure of approximately 5.5%. The other factors are less subject to guesswork. They are student-teacher ratios and enrollments.

Table 5 below shows an estimate of demand based on both the NCES and NEA assumptions and all eligibles for teaching certificates as reported by the NEA through figures collected by NASDTEC (National Association of State Directors of Teacher Education and Certification). (The NEA supply figures in this table are not corrected for the assumed percentage of those who are thought to actually seek teaching positions.) Under the NCES demand assumptions the seven year surplus would total 620,591. Under the NEA demand assumptions, the surplus would total 1,072,791 - the difference being almost one-half million. The difference in the two estimates of demand is accounted for largely by the assumption that some re-entering teachers will fill positions otherwise available to beginning teachers (2% of the previous year's total demand).¹⁰ The NCES demand figure assumes both beginning teacher demand and demand filled by re-entering teachers, while the NEA figures are adjusted to show only beginning teacher demand. In this sense they are not comparable if one is interested in the net oversupply of beginning or new teachers.

Table 5

Estimate of the Teacher Surplus Based on
Two Assumptions of Demand and All Eligible as
a Definition of Supply, 1969-1975

Year	(1) Supply of New Teachers Based on NASDTEC, NEA Reports ¹	(2) NCES Estimate, Demand for Additional, Certified Teachers ²	(3) NEA Estimate, Demand for Beginning, Certified Teachers ³	(4) Surplus Based on NCES Estimate	(5) Surplus Based on NEA Estimate
1969	264,217	233,000	184,480	31,217	79,737
1970	284,276	202,000	158,770	82,276	125,506
1971	313,558	172,000	115,355	141,558	198,223
1972	317,254	205,000	147,465	112,254	169,789
1973	313,141	203,000	121,000	110,141	192,141
1974	279,145	192,000	108,000	87,445	171,145
1975	238,000*	182,000	101,750	56,000	136,250
TOTAL	2,009,591	1,389,000	936,820	620,591	1,072,791

*Revised since NEA Research Bulletin, June 1976, which reports 255,889.

¹ NEA Research Bulletin, 1971-1976, Teacher Supply and Demand in Public Schools, NEA, Washington, D.C., 1972-R8, and Personal Communication, W. Graybeal, NEA, March, 1977. Figures are based on college reporting of new graduates to NASDTEC who meet minimum certification requirements for the first time (including both bachelor's degrees and first professional degrees).

² USOE, NCES. Projections of Educational Statistics to 1983-84, 1974 Edition, and 1984-85, 1975 Edition, Table 29, Col. (3). Total demand for additional teachers, less 2.0% of previous year for demand filled by re-entering teachers; NCES figures assume a teacher turnover rate of 7.8% of the previous year's total demand plus replacement due to enrollment change and pupil-teacher ratio.

³ NEA estimate is based on a turnover rate of 5.5% plus the NCES estimate of demand due to enrollment change and pupil-teacher ratio.

Table 6 shows an estimate of the teacher surplus after correcting for the percentage of students assumed to be seeking jobs. The surplus figure under NCES demand assumptions falls to 55,894 and under NEA assumptions to 508,074. Given the NCES assumptions and the NEA supply data, corrected for job seeking, the surplus problem can be explained away.

Table 6

Estimate of the Teacher Surplus Based on
Two Assumptions and Corrected for "Job Seeking"

Year	(1) Supply of New Teachers Based on NASDTEC, NEA Reports ¹	(2) Supply of New Teachers Corrected for "Job Seeking" ²	(3) Surplus Based on NCES Estimate	(4) Surplus Based on NEA Estimate
1969	264,217	189,972	- 43,028	5,492
1970	284,276	204,394	2,394	45,624
1971	313,558	225,448	53,448	110,093
1972	317,254	228,105	23,105	80,640
1973	313,141	225,148	22,148	104,148
1974	279,145	200,705	8,205	92,705
1975	238,000*	171,122	- 10,878	69,372
Total 1969-1975	2,009,591	1,448,894	55,894	508,074

*Revised since NEA Research Bulletin, June 1976, which reports 255,894.

¹ NEA Research Bulletin, 1971-1976, Teacher Supply and Demand in Public Schools, NEA, Washington, D.C., 1972-R8, and personal communication, W. Graybeal, NEA, March, 1977. Figures are based on college reporting of new graduates to NASDTEC (National Association of State Director of Teacher Education and Certification) who meet minimum certification requirements for the first time (includes both bachelor's degrees and first professional degrees).

² The NASDTEC, NEA figures are corrected for "job seeking" using the average for elementary-secondary teachers during the period 1952-1968 as reported by S. Carroll (1974); the percentage actively seeking elementary teaching jobs was estimated to be 81.0% and percentage seeking secondary jobs was estimated to be 65.1%. The combined figures average approximately 71.9% (based on proportions eligible to teach in 1975). The NEA uses a figure of 75% but is revising it upward.

The final table in this set shows an estimate of the surplus based on bachelor's degrees awarded to education majors given two assumptions regarding demand. Under the NCES demand assumptions, the surplus becomes a deficit. Under the NEA assumptions, the surplus totals 320,209 for the seven year period. The NCES column may be thought of as an estimate of the degree to which the reserve pool would be used up if the total supply of new teachers were confined to education majors.

Table 7

Estimate of the Teacher Surplus Based on
Two Assumptions of Demand and Using
Bachelor's Degrees in Education as
a Definition of Supply, 1971-1975

Year	(1) Bachelor's Degree Awarded in Education	(2) NCES Estimate Demand for Additional, Certified Teachers	(3) NEA Estimate Demand for Beginning, Certified Teachers	(4) Surplus Based on NCES Estimate	(5) Surplus Based on NEA Estimate
1971	176,571	172,000	115,355	4,571	61,216
1972	190,850	205,000	147,465	- 14,150	43,385
1973	194,210	203,000	121,000	- 8,790	73,210
1974	185,181	192,000	108,000	- 6,819	77,181
1975	<u>166,967</u>	<u>182,000</u>	<u>101,750</u>	<u>- 15,033</u>	<u>65,217</u>
Total	913,779	954,000	593,570	- 40,221	320,209

Summary

The figures below summarize the surplus estimates under the assumptions stated earlier for the period 1969-1975.

<u>Supply, 1969-1975</u>	<u>Demand, 1969-1975</u>	
	(1) <u>NCES Demand Assumptions</u>	(2) <u>NEA Demand Assumptions</u>
1. All Graduates* who Meet Minimum Requirements to Teach	620,591	1,072,791
2. All Graduates, Corrected for "Job Seeking"	55,894	508,674

*"Graduate" is a priority for all bachelor's degrees and first professional degrees (number unknown).

The figures below estimate the surplus using bachelor's degrees awarded in education as an estimate of supply.

<u>Supply, 1971-1975</u>	<u>Demand, 1971-1975</u>	
	(1) <u>NCES Demand Assumptions</u>	(2) <u>NEA Demand Assumptions</u>
Bachelors in Education	- 40,221	320,209

Given Richard Freeman's (1976) finding that only 46% of males with bachelor's degrees in 1972 obtained college level jobs, compared to 71% of comparable men in 1958, and that 65% of women were employed professionally compared to 81% in 1958, one suspects that the low estimates of the teacher surplus are too low.* That is, the surplus condition is

*One must bear in mind, of course, that in 1972, approximately 35.9% of all recipients of bachelor's degrees were eligible to teach either in elementary or secondary schools. Based on assumptions in Table 5 only about 47.4% of those meeting teacher requirements could have found teaching jobs; in other words, teaching jobs existed for only about 17.0% of all graduates even though more than one-third were eligible to teach.

grossly understated unless one takes "surplus" to mean only those who (a) unsuccessfully seek a teaching position and (b) remain otherwise unemployed. Data gathered by the Massachusetts Teachers Association (Randall and Zollo, 1974) showed that in 1973 that figure would have been about 2,753 of the 16,500 new persons certified to teach in 1973. Of the 16,500 certified to teach, 8,431 or 51% were not in teaching in October following graduation. The Pennsylvania (1975) data paint a similar picture. In Pennsylvania the gap began to widen in 1968-69 between numbers of teachers prepared to teach and those who actually found teaching jobs by November 1 of the academic year following graduation. The figures for Pennsylvania are listed below in Table 8. The percentage in 1973-74 not in teaching is 46.3%, rising to 50.7% in 1974-75. A total of 2,597 continue to seek teaching jobs in 1973-74, or approximately 25% of the total. An additional 1,699 found employment in non-teaching fields.

Table 8

Pennsylvania Education Graduates Placed in
Teaching Positions, 1963-69

Year	(1) Prepared in Elementary Education	(2) Prepared in Secondary Education	(3) Total Teaching	(4) Total Not Teaching		(5) Employed in Non- Teaching		(6) Seeking Teaching Position November 1	
				E	S	E	S	E	S
1968-69	5,783	7,018	12,801	667	1989	118	517	211	576
1969-70	5,791	6,295	12,086	816	2459	118	542	315	641
1970-71	6,251	7,938	14,189	1463	3228	219	709	748	1191
1971-72	6,339	7,821	14,160	1791	3404	339	986	986	1398
1972-73	6,359	8,050	14,409	2194	3716	615	1270	1113	1531
1973-74	5,827	7,225	13,052	2510	3544	752	1348	1357	1557
1974-75	4,402	5,909	10,311	2123	3114	611	1088	1224	1373

The Massachusetts study also found that approximately 83% of those in non-teaching employment would accept a teaching position if offered or were actually seeking such a position. This figure may be a fairly good estimate of the degree of underemployment among teacher education graduates. Of 16,500 certified to teach, 4,106 were employed full-time, or nearly full-time, in a position other than public school education and approximately 2,753 were unemployed or employed less than half-time (Randall and Zollo, 1974). The proportion of beginning teachers in both states unable to find teaching jobs is approximately one-half of those eligible. In Pennsylvania in 1968-69, for example, the percentage unable to find a teaching job was 20.7%. These figures provide a fairly good estimate of the dimensions of the teacher surplus. The proportion able to enter teaching nationally has dropped from 71% in the period 1952-1964 to approximately 52% in 1974, if one believes the NEA demand assumptions. Such a figure is consistent with the NEA's sampling of placement centers and it is consistent with data from two populous states. The actual teacher surplus, therefore, might be estimated as one-fifth of those graduates who are prepared to teach and meet minimum requirements for teacher certification from 1969 to 1975. That total would be about 500,000 potential teachers.

Shortages Ahead?

The demographic facts of the 1980's, as seen now, combined with inertia in the educational systems, may produce a teacher shortage in the mid-1980's, according to Carroll (1974) and Morrison (1975). First, they argue that projections show the 22 year old cohort will begin to decline by 1983 and reach bottom just as the 5-13 year olds are beginning to increase in number, thus reversing the present condition. The first projection is certain barring pestilence, disease, war, or famine. The second projection depends on fertility rates. The current forecast may understate the actual numbers or overstate the expected bubble. Whichever the case, schoolmen will have a 5-6 year lead time for adjustment.

The problem may be further exacerbated as follows. Carroll (1974) expects the now active and large reserve pool of teachers to be largely used up by the mid-1980's as supplies of new graduates dwindle. There will be larger proportions of teachers retiring during that period due to the large influx of teachers during the late 1950's and throughout the 1960's. The current Series II forecasts show an increase of about 3 million in the 5-13 age group from 1985 to 1988, placing renewed demand on the system. The assumption is that, unlike engineering, the decline in new teachers for the remainder of this decade will not eliminate the surplus condition because of the large reserve. Thus, the reserve will eventually be cut into as new teacher production falls below replacement. Inertia is thus inevitable in the upturn of demand because it takes at least four years to produce a new teacher to meet demand.

However, even in the 1980's, there will remain a very large pool of persons who were unable to find teaching jobs (my guess is that the figure of 500,000 is a fair estimate for the years 1970-1975). Unless the output of schools of education falls to zero (unlikely), that reserve pool will not be used up and could be attracted to teaching jobs. The oldest persons in the reserve pool would only be 37 years old in 1985. Even if extended refresher courses were necessary to prepare reserves for duty, the availability of this century's largest reserve manpower pool (other than the army reserve, the largest commonly trained, unused resource in the world) makes any serious and protracted shortage in the 1980's unlikely.

II

IMPACT

Consequences for Teachers and Teaching

The consequences of contraction are multifaceted - some much more likely than others, some largely a matter of policy choices yet to be made. Among those well under way are (a) a declining market for teachers and teacher educators, (b) a loss of revenue for the universities which typically view teacher production as a "money maker," (c) a loss of opportunity for many rural and small town youth who choose teaching as an upwardly mobile career track, (d) decline in federal subsidies designed to reduce teacher shortages, (e) tightened hiring standards among school districts,¹¹ (f) heightened rate of "professionalization" (i.e., raising the level of prerequisite education required for teacher employment without substantially changing the function or tasks of teaching), (g) a general slowing in the rate of increase of teachers' salaries, and (h) cost-cutting in teacher training by such options as shifting the financial burden and responsibility for student teaching to the school district level or curtailing such practices as vouchers in lieu of payment to supervising teachers.

Another option is to shift emphasis from preservice training of teachers to in-service training of those already employed. That option seems to be an obvious one and is tied to consequence (f) above - heightened professionalization. Still another option is a shift toward training of teachers for the remaining shortage areas such as special education. That is also an obvious option. A more radical option would be a shift in focus from the public and regular non-public schools as the primary market for teacher production to a much broader market including training and education-related fields such as training of nurse educators and other paramedical teachers, corporate sales and management training, military training and adult basic education. This last option probably

requires the greatest attitudinal change in traditional colleges of education, and is thus the least probable option to be chosen in the short term.

A more drastic option is the complete changeover in selected college programs from teacher training to paramedical training and training in related fields such as social work, which requires a basic liberal arts background, at the baccalaureate level. The state college liberal arts departments would be left intact as more and more emphasis is placed on "broadening" of paramedical education. The shift would dislocate a portion of the teacher training faculty, but such a shift may be the only salvation for some state colleges and private colleges which now rely primarily or entirely on teacher candidates as their source of entrants. This option will be more likely to begin taking shape if some form of comprehensive national health insurance is approved by the Congress which carries with it a provision of subsidies to training paramedics (one can observe in the teachers' colleges locally such shifts taking place gradually).

The Ripple Effect

One of the surest effects of contraction in the elementary-secondary school population is a subsequent contraction of the higher education population six to twelve years later. Although the historical percentage of high school graduates who enter college (two or four year programs) has been steadily rising, the ratio of high school to college graduates has remained much more rigidly fixed. While greater proportions of high school graduates have been starting college programs, about the same proportion continue to drop out. As long as the rise in the percentage of first time college enrollments continues to offset the decline in actual numbers of high school graduates, higher education will not contract. However, since the percentage of high school graduates entering two or four year post-secondary programs now exceeds 50%, one can anticipate an eventual slowing of that growth curve, perhaps as early as 1980. Even if the percentages of entrants continues to rise, the overall college

population by 1980-82 will begin to decline. Cartter's data show the college-age population (18-21 year olds) peaking in 1978 at 16.8 million, and declining by 1988 to 14.0 million.¹² Cartter's projections also show a peak in full time equivalent (FTE) enrollments of 9.7 million in 1982, declining to a low of 8.4 million in 1982. The peak is not regained through 1990; Cartter's projections show the FTE enrollments rising again to 8.8 million in 1990.

The obvious effect is for a contraction to follow in available academic employment. It is not necessary, however, to translate that effect into widespread unemployment for teachers and other academic workers in the post-secondary field. The more likely prospect is for underemployment or, in other words, the transfer of the surplus teaching force to other occupations which may not fully utilize their academic talents. There are quite considerable implications herein for elementary-secondary education. Unquestionably, leadership positions in public schools, which once constituted opportunities for career-minded teachers, will more and more beckon academics who find the going rough in finding opportunities in higher education. This "bumping" process, which is further explained below, has already begun at the community college level.

In view of these prospects, one would expect a substantial decline in the number of students willing to begin teacher training and the institutions willing to offer such. No substantial decline was evident as late as 1973. There are several reasons why demand persisted in the face of almost assured reality of surpluses. For one, individuals feel they will make it, despite the poor prospects for others.

A second factor is the belief that even if employment in teaching is blocked, the student with a degree has an advantage in finding other employment. Despite Ivar Berg (1970), such a belief is probably well substantiated. A third factor is likely to be the willingness of the prospective new graduate to simply wait for employment opportunities to emerge in a tight field, or to defer job seeking until his acquiring more education gives him a relative advantage over competitors with less training. In the case of teachers, assuming equal chance on each graduate's

behalf, the chances of finding employment were roughly 60%, assuming about 145,000 vacancies and approximately 240,000 potential job seekers in 1971.

It appears the contraction in supply of teachers will have to be initiated first by individuals unwilling to invest in their preparation for a field with shrinking opportunities. Few schools of education are willing now to arbitrarily close down or drastically reduce available slots for teacher candidates. Until the demand from students slacken, the oversupply of teachers will persist. It appears, from the deeply ingrained belief of many individuals, that advantages accruing to the educated are greater relative to the cost of obtaining an education, that a chronic surplus may last for some time if left strictly to voluntary action.

Lag in Response

It has been suggested that the lag in voluntary response to changing market conditions, such as those described above, is subject to several factors. Among them is a delay in data collection, and a delay in awareness once data are collected and assembled. Delay may be further exacerbated by cognitive dissonance (i.e., the readers of such data may find it very difficult to fully digest if the data are at very sharp odds with their wishes or hopes). Further, as DeWitt and Tussing (1971) suggest, there is the "sunk costs" lag. A great many people have work in progress toward degrees which represents an emotional and financial investment that they will not easily abandon. The same factor applies equally to students and institutions. The difference is that institutions will be forced to abandon their investments whenever students do. Universities are likely to resist any major dismantling of programs that have grown in size and prestige. Their likely, and in some respects understandable, response is to tighten up and attempt to hold on until the storm passes. It also takes time to reformulate new plans and find the support and means to implement them. One of the responses discussed later is to increase the ratio of acceptances as applications fall, temporarily stabilizing enrollment.

The lag in response to imbalance will also be influenced to a great extent by the process of professionalization, a process familiar to many readers of Ivar Berg. The process reverses in principle the notion of supply following demand. What is suggested is that as supply of educated manpower exceeds demand at some level of the occupation structure, those with more education will begin to "bump" those at lower levels which heretofore did not require as much education. Cartter suggests the level where most "bumping" will take place is at the community college level where less than 6% of the teachers hold doctorates. Thus, the 2-year colleges will be closed off in the future to many secondary teachers who heretofore might have moved into those openings. The same process can be expected in administrative and supervisory positions at the elementary-secondary level. The eventual result is that occupations whose basic functions and skills do not change will gradually begin to require, as a condition of employment, more and more education. Jobs taken over by surplus educated manpower will begin to "require" those levels of education. Requirements seem to adjust to the characteristics of the labor force available for them except in cases where strong union organization stands to lose rather than gain from such a process. Another part of the "bumping" process is now taking place within school systems. As programs are cut, tenured teachers begin a bumping process which may extend through several positions, ending eventually with the least experienced teacher being forced out. One of the consequences is to increase average salaries and thus per-pupil costs.

Policy Response

A perfectly reasonable policy response is for the states to begin shifting support for post-secondary education away from the teaching profession, forecasted by the Bureau of Labor Statistics to have by 1980 a supply "significantly above requirement," to support for training in those occupations forecast to be in chronic short supply; namely, physicians, dietitians, physicists, counselors, dentists, and paramedicals.

Although a shift away from overall teacher production seems warranted by every available study of teacher supply and demand, an overly

simplistic policy may lead to cutbacks in programs that are essential for quality education. However, the record of any policy action is not a promising one.

Dwayne Ward (1975) found that out of 40 states surveyed, five states are "involved in some kind of labor market planning and five are engaged in planning" (p. 29). Illinois appeared to Ward to have taken the strongest action. Yet, the most recent NEA data on state production and employment of teachers does not distinguish Illinois from the remaining 49 states.¹³

Graduate Level Responses

The graduate enrollment in education has not reacted the same way to market forces as undergraduate enrollment. Using NCES data on students enrolled in masters and doctoral programs in colleges of education, we find that enrollments have doubled from 1965 to 1973.¹⁴ One might reasonably conclude that the same factors which produced enrollment declines in undergraduate programs have resulted in increases in graduate programs. The shrinking teacher market apparently has had the effect of increasing competition for jobs. Particularly sensitive are the non-teaching professional positions that require graduate credentials, which are sought by teachers who wish to advance, and therefore produce a pressure toward advanced degree-seeking as a means of maintaining relative advantage over others. I cite the example of the masters degree which once provided sufficient advantage to seekers of administrative positions but no longer does. It does not, not because the job functions have greatly changed and require significantly different skills, but, rather, because a very large proportion of those who apply have their masters degree. The relative advantage has diminished proportionately, yet the masters must still be sought so the holder can then qualify for the next highest credential. The pressure of a shrinking market has undoubtedly accelerated this process and may account in part for the growth of enrollments in masters and doctoral study. That growth has occurred not only in an absolute sense but also relative to growth of all graduate enrollments.

Educational graduate majors, relative to all others, increased from 28.0 percent of total in 1965 to 33.6 percent in 1973.¹⁵ Education graduate degrees were 34.4% of the total in 1964-65; 38.9% of total in 1974-75.¹⁶

Response by the Profession

It has been argued that the problem is not simply too many teachers but, rather, not enough teachers with certain attributes.¹⁷ The attributes are twofold: (a) those which define the quality teacher; and (b) those which define the qualified teacher. In the case of the latter, the argument is not new and may be traced in the United States back well into the 19th century.¹⁸ The nature of this argument allows one to debate at any time we have a teacher shortage or surplus by simply altering what is meant by "qualified." The history of this debate shows that what is meant by the qualified teacher has generally been a matter of the level and kind of formal education courses taken by the teacher as established by the profession, required by state law and provided by schools of education. It is also the case that the minimum qualification required to teach has constantly risen throughout this century but has been altered to adjust to supply. This debate seems to be political and one of the professional system, rather than one of education. It has no necessary logical connection to education. Its connection is rather to a system of education, to the polity of education. It is a question entirely of determining how power and authority within the system of education will be distributed; prior to the emergence of the educational system such a question would have been moot. Those volunteers from the community who were themselves literate could and did assist in the development of literacy among children. The children, once literate, assisted other children.¹⁹ No one has ever seriously argued that these kinds of attributes (i.e., those that have to do with the qualified teacher) are necessarily connected to learning outcomes. James McClellan (1968) argues, rather, they have to do with restricting a market in labor.

Quality

It is not precisely clear whether this debate implies that certain attributes are necessary for the "good teacher," because they are connected to (a) the direct benefits of education (certain attitudes, skills, knowledge, presumed to be the result of learning), (b) the indirect benefits of education (presumed to be some measure of social success; e.g., skills needed to work and earn a living), or (c) to some other outcome such as the social or psychological development of the child. It may be argued, on the other hand, that what is meant by the good teacher has nothing to do with any of these kinds of outcomes or outputs but, rather, with how well the teacher performs certain acts of teaching regardless of any outcome. For instance, the good teacher may be well organized and present not only an interesting lesson but also one which is based upon behavioral objectives, employs feedback and a variety of teaching strategies. The good teacher, rather than one who employs a competency based approach, may simply be one who is humanistic or very articulate, dynamic or charismatic or non-directive, or whatever. If it is the case that such attributes are not valued because they are connected to any particular learning outcome - that is, have no particular meaning which is dependent upon their consequences - then we are speaking of something akin to ritual.

However, if in fact, the good teacher is one who has these attributes and that produces certain desired consequences, then we are speaking of something very important...what one might call praxis. The question of quality teaching then becomes answerable in terms of whether action has meaning for certain desired consequences. That question can be studied empirically. It is a matter of observation whether good teaching produces desired results. Thus, far few of the attributes examined in the larger context of schooling have been shown to strongly, or even, moderately, explain variance in learning as measured by standardized achievement tests, net of the effects of the child's intelligence and family background.²⁰ The one exception is verbal ability of the teacher (cf. Jencks, et. al., Coleman, Hanusher). This point takes on very great significance later in the analysis of SATV score declines among freshmen indicating an education major.

It isn't clear just where the quality teacher argument leads us. One place it may lead us is that so far, at least, those people who possess the particular attributes we seek do not necessarily come from schools of education. Indeed, they may not even come from colleges or universities. At question is whether the particular skills required for the conduct of education are themselves a result of experiences in the education system. The very fact that the definition of what is a good attribute for teachers has changed repeatedly since the last quarter of the 19th century suggests either that professional educators have not been able to discover what actually constitutes the effective teacher (as opposed to what constitutes the dutiful teacher), or that each act of discovery is followed by a change in condition which renders the discovery false. One may well be led to conclude that there aren't enough quality teachers but that conclusion may have nothing to do with any specific conclusions about surpluses or shortages of output from colleges of education. Indeed, we may wish to conclude that no matter how many teachers are graduated from colleges of education, we won't get the desired attributes except by chance, on the assumption we neither know what attributes are necessary for effective teaching nor how to reproduce them.

The first of these arguments arises out of the peculiarity of schooling. The second is generic to teaching. What constitutes the good teacher is as much an issue in the hospital field as in kindergartens and was as of much concern to Plato as to the NEA. What we may, indeed are very likely to, discover is that business and health care educators already can teach some kinds of things very effectively - more effectively than we in the "profession of education." That being the case, our intent should be to capitalize on that talent and incorporate it in the production of more talent. In the event we discover that it is we who have little concrete to offer, our challenge is complete. What is more likely, in my judgment, is that business and health care are discovering problems under the current label of "quality of work life" which, if these are to be resolved, will require the cooperation of the entire

community of education, kindergarten to graduate school, together with the emerging human resource management concept in business and health.

James E. McClellan (1968) summarizes the arguments made above in a piece from his excellent book, Toward an Effective Critique of American Education (Lippincott, 1964). He talks about the relationship between certification and wages, and then tells of an incident which eloquently expresses the role of certification in education.

...raising standards of certification by increasing the number of college courses that must be taken by any person wishing to enter, remain, or advance in a given occupation is a relatively slow but effective way of raising salaries in the System as a whole. The more specific the course requirements for a particular position in the System, the more certain and rapid the effect in raising salaries for that position and all others above it in the same 'line.'

As a result, the forces, motives, and consequences of certification combine to make courses in Education a central feature of the state's control over the corps of teachers. In the early days of the Massachusetts Bay Colony, a testimonial of good character by a minister was required of anyone who would be a schoolmaster. The same principle has to be followed by any state authority which takes cognizance of its schools and the welfare of the pupils in them: the state must require its especially trusted citizens to attest to the qualifications of those who would be teachers. But who are its especially trusted citizens? In default of an established church, we establish a secular institution--the Department of Education--which takes on the role of examining character. And we attach Education to the academic world, with extraordinary results which we will examine later.

For both ideological and temperamental reasons, Educationists are concerned with the character of their students in a way which can be rather easily distinguished from other academic types....

Once when I was a very junior and eremitic instructor at a large university, I overheard an interchange between another teacher and a clerk in the registrar's office. These were pre-IBM days when faculty members were required to bring semester grades directly to the registrar. The clerk had noted that my colleague, who like nearly everyone else on campus was completely unknown to me, had left a blank beside a student's name. 'But, sir,' she said, 'you must put in something--a W if the student was passing the course at the time he withdrew or an F if he was failing.'

'Then mark it F. I have no idea who he was or what he was doing.'

When he said that, I knew at least that the professor was not a member of the Department of Education. If the Educationist had not known the student, he would not have admitted it. If he had no reason to believe the student was failing, he would have assumed that he was passing. The professor of Education may never know any student with the depth or intimacy that sometimes is found in the relation between student and professor of other disciplines, but he will try to know every student well enough to spot the potential scandals in advance and to weed them out. The standards for acceptance are not high, perhaps, but then when a seventeenth-century minister affirmed that a parishioner was 'of good character,' he too made a rather minimum judgment. In either case, it was probably enough to eliminate those teachers who, under decent conditions, would do positive harm to their charges.

Collapse of the College Market

The education market for teachers was not alone in its deceleration during the 1970's. The job market for all college graduates has collapsed. The education market merely constitutes the largest, and in some respects, the most vulnerable market. There is a peculiar involution to this education system. Approximately one-third of the graduates of this system are prepared to re-enter the system as its teachers. As Kenneth Boulding once said, dynamic systems are like bicycles. When they stop, they fall over. Education is perhaps more like an elephant on a ball, to use Freeman's metaphor. When it stops rolling, people run for cover.

Colleges alone hire a relatively large number of college trained. Demand at the college level depends in part, therefore, on those who seek academic teaching careers, and in very large part on those who seek to teach below college level. If many seek such careers, they drive up demand for more faculty and employment opportunities and conditions improve. The situation becomes unstable, however, once the number of students levels off, demand for new faculty declines, causing a decline in the number of students considering academic teaching careers, thus further reducing demand. The circular nature of the system makes the academic market exceptionally vulnerable to changes in demand. James E. McClellan's (1968) definition of the System is informative here.

This gives us the first clue to a functional definition of the (Educational) System: It is that part of the total educational enterprise of the society which automatically receives more students, or better

students, or longer control over students, or some combination of the above, whenever a decision is made to upgrade educational requirements anywhere in the nation's economy.

What McClellan did not say is that the system receives fewer students, or poorer quality students, or shorter control over students, or some combination whenever a decision is made to downgrade educational requirements anywhere in the nation's economy!

The Signal

From 1961 to 1969 humanities and social science graduates had annual real pay increases of 2.7%, exceeding average hourly earnings (2.6%), and in annual full-time earnings (2.1%). But from 1969 to 1975 pay dropped precipitously from \$608 per month (1967 dollars) to just \$470 per month - below the level obtained by similar graduates 15 years earlier. Freeman (1976) argues this is a major break with past economic trends. He argues that inflation made the adjustment quicker but was not itself the cause of decline. The incomes of all college graduates, relative to that of high school and grade school completers, evinced some weakness. In 1969, college male graduates enjoyed incomes 53% above high school and 99% above grade school counterparts. By 1974 the advantage had fallen to 35% and 94% respectively. Real starting salaries for bachelor's degree holders had fallen in almost all fields. For humanities and social scientists starting salaries (real dollars) fell from \$600 per month to \$450. Salaries of teachers dropped in real terms by 2.5%, 1971-1974. In 1970-71 teachers earned 27% more than the average full-time employee in the economy but, by 1974, the relative advantage had fallen to 12%. In 1969, full-time female teachers earned 45% more than average full-time female workers in the economy, but in 1973 earned only 37% more.

The collapsing college market is seen in other data. The percentage of graduates reporting no job found as reason for not using a college major increased from 10% males and 12% females in 1950 to 43% males and 60% females in 1972 (the larger gain for females no doubt reflecting the oversupply condition in elementary education, a field dominated by female graduates). In 1972, over 30% of men and 25% of women with bachelor's

and first professional degrees ended up employed in non-professional, non-managerial jobs, compared to 5% of the bachelor's and first professional degree holders in 1958. The proportion of male college graduates working as salesmen increased by 23% and the proportion of female graduates working in clerical positions increased by 26% from 1969 to 1974. The level of unemployment among new college graduates was double that of the national workforce by 1972 - 11.7% unemployed compared to 5.1% for the workforce as a whole. Humanities and social science had the poorest records, with 15.4% and 16.0% unemployed respectively. The Massachusetts Teachers Association data shows 16.6% of newly certified teachers unemployed in late Fall 1973 in Massachusetts.

The obvious result of the college job market collapse is a decline in investment in higher education, falling from an estimated annual return of 11.0% in 1964 to about 7.5% in 1973. The effect is clear. A smaller proportion of high school graduates are electing to make the investment. One would assume that a decline in economic rewards for college attendance is most likely to severely deter those with only modest means of support. Yet, Freeman (1976) shows that the largest declines in probability of attending college occurred in the lower middle class (\$5,000 - \$10,000) from 1969 to 1973, not the lowest income group (one possible explanation being that only the brightest from the bottom group attend college in any event), followed by the middle income groups (\$10,000 - \$15,000). Enrollments of 18-19 year old males fell from 1,397,000 in 1969 to 1,262,000 in 1974. The percentage of male high school graduates enrolling in college fell from 60% in 1969 to 49% in 1974.

The net effect is a downward trend in the educational attainment levels among all young persons of college age (rising since the last quarter of the 19th century). For the first time in American history, cohorts of college-age youth were less likely to obtain a college education than cohorts before them. There are exceptions. Black males are attending college in larger proportions and female attendance has stabilized.

Freeman (1976) also finds that graduate school enrollments are declining as a ratio of bachelor's degrees awarded, although in education there has been a relative increase. For every 100 bachelor's degrees awarded in 1968, there were 72 graduate enrollments. By 1971 this ratio had fallen to 63. However, it is important to note that, as with the case of high school diplomas and college BA's, the floor rises more rapidly than the ceiling. Bachelor's degrees increased from 631,923 in 1967-68 to 883,460 in 1971-72. The actual numbers enrolling in graduate programs increased from 458,000 in 1968 to 525,000 in 1971, a 14.6% increase, as compared to an increase of 39.9% in bachelor's degrees awarded.

Why the bust? Freeman (1976) finds that while demand for college education grew sharply during the 1950's and 1960's, supplies did not. There was extraordinary growth in the education sector, in federally funded R & D, and in government employment and government financed technology. Growth in these sectors has begun to slow down as supplies were beginning to accelerate. The 1969-1974 rates of growth in federal public administration, finance, education, college intensive manufacturing (ordnance, chemicals, instruments, aircraft, electronic machines, etc.) have all fallen well below rates of growth of 1960-1969. All college-level manpower intensive employment sectors combined have slowed from an annual growth of 4.4% in 1960-1969 to 2.8% in 1969-1974. From 1960-1969 employment in the college intensive sectors grew twice as rapidly as all other industries - the differential now is less than 0.8%. Freeman (1976) concludes that the bust is due clearly to a deceleration in rate of growth of demand for college workers relative to that for less educated. The cause was a shift in industrial composition of employment - a shift involving slower growth in those sectors of the economy where relatively large numbers of college trained are needed.

The Freeman (1976) prognosis may be stated as follows:

...the analysis in this book [The Overeducated American, Academic Press, 1976] suggests that the college job market will remain in a relatively depressed state through the end of the 1970's, experience a moderate improvement in the following decade, but not return to the boom conditions of the late 1960's (p. 79).

Response of Institutions

There are several significant questions raised by the following analysis: Do colleges and universities respond to changing market demand as aggressive entrepreneurs? Or do they, as Deans of Education would have us believe, adopt an attitude of benign neglect (i.e., allowing students simply to "vote with their feet"? Do shifts in market demand stimulate changes in the in-take processes of colleges and universities? Is there a significant decline in the quality of those entering preparation programs for fields in decline? Do colleges and universities function to produce a steady flow of only the "best and the brightest" into the social institutions of this society? Or, is their function, rather, to produce a steady flow of "credentialled" persons? These are entirely different questions. If institutions were to accept declines of more than 20% in an important measure of a student attribute, one reasonably believed to be a determinant of later professional effectiveness, the question would seem to be answered. Unless the institution had absolutely no intention of awarding a credential to such students, although the students were admitted to a professional preparation program believing they would receive a degree, the question is answered. On the other hand, if that were the case, another kind of question is raised, one of propriety.

The basic arguments which guide this inquiry may be stated as follows. The arguments postulate that as market demand for new graduates in a given field declines, the quality of the student body entering that field of study will also decline. The major argument assumes that institutions adapt by selecting the best from a declining pool of talent but in so doing sacrifice absolute standards for relative standards. Some fraction of those who would ordinarily enter the field choose not to do so, exercising an option to enter other fields, and leaving behind those who choose to remain and those who have no choice. Transfers are constrained by the minimum level of ability required in the preparation for various professions. For example, a student whose combined SAT score exceeds 1200 will have more options (i.e., he will be less constrained) than a student whose combined score falls below 800. Falling applications

stimulate an increase in the ratio of acceptances and a decrease in mean test scores among entering students, relative to other fields not in decline and relative to general test score decline. The principle would hold true for both graduate and undergraduate programs.

The higher the minimum ability level required of a field of study, the larger the number of options for potential transfers out to other fields. A potential aeronautical engineer may opt for a career in math, physics, bio-chemistry, or even teaching high school science, but the typical would-be elementary teacher will find fewer options open because of the much higher cut-offs in minimum score requirements of nearly every other field. Thus, it would be expected that fields like engineering might respond more rapidly to market signals than fields like education, although in both fields some response is inevitable. New supplies of engineering graduates relative to market demand do tend to be more responsive than any other field. Enrollments fell 27% nationally in engineering from 1969 to 1972 due to declining demand. Although elementary education has fallen from an average employment rate of 80% (1952-1968) to 50% or less since 1969, the enrollment response has been much less rapid than engineering. (In the cases examined later, enrollments have fallen precipitously in education, but in the teachers' colleges the enrollment decline did not sharpen until after 1973, four years after the market decline itself began.) Stephen Carroll (1974) estimates that as an index of qualified candidates in education programs in 1966, the ratio had fallen to .892 in 1972.

The provision of options will temporarily worsen the problem of deteriorating test scores. In those cases where options are readily available (deliberate policies to expand programs in "transferable" fields; e.g., to allied health from education), SAT scores and applications are likely to drop more rapidly. It is assumed that teacher education programs in universities in general were forced to "shrink" faster and earlier than teachers' colleges. (Ward (1975) suggests this has been the case.)

In fields which require higher than average minimum abilities, in theory, it may be postulated that some threshold point exists below which

no student would be deemed capable of succeeding, nor one presumes admissible. Physics or medicine may be good examples, although considerable flexibility may exist in both fields. Engineering is examined later in three universities and test scores suggest a wide latitude. However, in a field such as education, there seems to be little concrete evidence that any threshold exists, yet a reasonable criterion does exist for establishing a minimum. Declining verbal test scores are theoretically, and empirically (if Guthrie, et al., Coleman and Jencks are to be believed) predictive of declining effectiveness in teaching. Presumably, since verbal ability of students correlates with verbal ability of teachers, independent of family background of student, teachers training institutions would select only the verbally gifted, other things being equal. Such is not the case.

Adaptation

These arguments direct attention to a very important function of higher educational institutions. One can assume generally that entry level abilities have not over this century remained constant in every field; indeed, the evidence seems to point to a decline in abilities as demand for new graduates in the field declines. But regardless of any specific fluctuation in such abilities, one can postulate that as those abilities rise, the entrance criteria and grading or evaluation standards also rise. And as abilities decline, entrance and grading standards also decline. Such a state of affairs is empirically demonstrable and is explained in part by adaptation theory (Goldman, et al., 1974) which predicts simply that evaluation standards are determined in large part by the overall ability level of the student population. The prevailing population constitutes a field against which individual students are anchored. Each student is judged in the context of other students' performances or potential for performing.

As applications rise, the field against which choices are made enlarges. If entering abilities rise without a subsequent corresponding increase in grades or those who "pass with honors," it means standards

have "risen." In the reverse, if ability declines without a decline in grades or those who "pass with honors," then standards have fallen. The latter seems to be the rule as applications decline.

Goldman, Schmidt, Hewitt and Fisher (1974) found at the University of California, Riverside, that adaptation theory explained results at middle and lowest ability levels, viz., they found easy grading standards for the lowest ability fields (political science, sociology and Spanish) but there tended to be substantially higher standards in math and science together with higher ability students (using SAT scores as their measure of ability).

Freeman (1976) found in his study of medical schools that when the market was strong, as in the 1970's, standards are raised. Acceptance policies become more restrictive. In the 1950's and early 1960's applications fell and medical schools admitted only 10% to 15% with straight A averages in undergraduate studies. In 1973, with applications sharply higher, straight A's increased to 36% and the Medical College Aptitude Test scores went up for those accepted.

Engineering

The figures attached (Figures 1-8) show the applications, acceptances, registrations and SAT verbal and motor scores of three schools of engineering. The admissions data have been converted because of restrictions as requested by the providers of this information. The pattern at two of the schools is nearly identical. Figure 1 (attached)* shows a rapid fall-off of applications, paralleling the national pattern as shown in Figure 3. In 1973, the first school of engineering (I) moves to a position of open enrollments (Figure 1). As seen in Figure 2, mean SAT verbal and math scores of that school fall approximately 80 points. Rising enrollments since 1973 are accompanied by an equally rapid increase in acceptances.

*All figures are attached.

The second engineering school (II) is shown in Figure 4. Both schools hit bottom in applications in 1973, but the second school remains somewhat more selective and one can observe in Figure 5 a less severe decline in SAT test scores. Figures 6 and 7 show the third engineering school. Figure 8 compares the ratios of acceptances of the three schools which are seen to rise, as expected from the arguments above (see Table 9 below for ratios and test scores in the three engineering schools).

Table 9

Ratio of Acceptances to Applications, and SAT Scores in
Three Engineering Schools, 1969-1975

Year	(I)			(II)			(III)		
	Ratio	SATV	SATM	Ratio	SATV*	SATM*	Ratio	SATV	SATM
1969	.425	545	655	.517	513	621	.881	522	634
1970	.527	573	654	.567	516	602	.904	519	626
1971	.795	542	590	.594	530	630	.901	519	626
1972	.666	507	595	.734	494	613	.954	514	615
1973	.907	570	615	.789	511	622	.957	505	611
1974	.871	490	571	.728	517	609	.943	500	609
1975	.775	481	571	.691	500	601	.944	496	606

*Median test scores.

The third school of engineering (shown in Figures 6 and 7), a major school with much larger enrollments, shows a different pattern in test score and enrollment decline over the same period. Acceptance and application data show that as applications fall, ratios of acceptance rise only slightly--being high to begin with. Test scores fall less rapidly than in the other schools. The scores and enrollments are shown below.

A Major School of Engineering (III)

<u>YEAR</u>	(1) <u>SATV</u>	(2) <u>SATM</u>	(3) <u>ENROLLMENTS</u>	(4) <u>H.S. RANK</u>	(5) <u>RATIO OF ACCEPTANCE</u>
1967	523	629	1,678	85	.874
1968	524	622	1,482	85	.864
1969	522	634	1,393	85	.881
1970	519	626	1,446	85	.904
1971	519	626	1,086	85	.901
1972	514	615	945	84	.954
1973	505	611	1,117	83	.957
1974	500	609	1,240	83	.943
1975	496	606	1,480	83	.944

Education

Eleven programs of teacher preparation were examined. Entry level test scores, applications, acceptances, and enrollments were available from ten of the programs relative to other academic divisions within the same institutions. Without exception there have been rapid declines in applications, accelerating ratios of acceptances, falling test scores and declining enrollments. In some instances the mean SAT verbal scores have fallen nearly 100 points. The 1970-1975 scores are shown below.

	<u>1970</u>		<u>1976</u>	
	<u>SATV/M Enrollment</u>		<u>SATV/M Enrollment</u>	
1. SED. university based (I)	52/53	602	47/49	175
2. SED. university based (II)	51/54	215	47/49	175
3. Teachers College A - Elem. Ed.	42/48	333	39/41	28
4. Teachers College B - Elem. Ed.	50/56	380	42/45	84
5. Teachers College C - Elem. Ed.	47/50	208	42/45	31
6. Teachers College D - Elem. Ed.	49/52	244	44/48	39
7. Teachers College E - Elem. Ed.	46/48	169	43/46	19
8. Teachers College F - Elem. Ed.	49/52	282	40/43	77
9. Teachers College G - Elem. Ed.	50/52	164	43/46	8
10. Teachers College H - Elem. Ed.	45/47	160	41/42	29

$$\bar{x} = 47.2/50.1$$

$$\bar{x} = 41.7/49.5$$

Nation Test Score Decline 45/48

43/47

National mean SAT scores have fallen in both verbal and math areas (approximately 5.5% in verbal (from 455 to 431) and approximately 3.8% in math (from 488 to 472)). The test score decline in the ten teacher preparation programs is much more severe. The two university-based programs, taken together, have had an average decline of 9.5% in verbal scores and 9.1% in math scores. The teachers colleges combined show an average net loss of 13.1% in verbal test scores and 12.5% in math test scores for entering elementary education majors. The largest loss of any one teachers college is 22.5% in the verbal test score. The smallest loss is 4.3% in math test scores of one institution (see Table 10 below for test scores for teachers college, 1970-1975).

Table 10

Teachers Colleges SAT Scores for All Entering Freshmen
Compared to Elementary Education Freshmen and
National Average, 1970-1975

	<u>1970</u>		<u>1971</u>		<u>1972</u>		<u>1973</u>		<u>1975</u>	
	<u>College</u>	<u>Elem.</u>	<u>College</u>	<u>Elem.</u>	<u>College</u>	<u>Elem.</u>	<u>College</u>	<u>Elem.</u>	<u>College</u>	<u>Elem.</u>
	<u>SATV</u>	<u>SATV</u>	<u>SATV</u>	<u>SATV</u>	<u>SATV</u>	<u>SATV</u>	<u>SATV</u>	<u>SATV</u>	<u>SATV</u>	<u>SATV</u>
A	46	46	46	46	44	43	42	42	39	422
B	50	49	49	48	48	48	48	47	42	415
C	47	45	48	46	48	45	46	41	42	400
D	49	49	48	46	49	47	46	46	44	417
E	46	46	46	46	46	46	43	43	43	415
F	49	49	47	48	47	47	45	43	40	389
G	50	48	48	47	46	46	46	44	43	403
H	45	44	46	45	45	44	43	41	41	409
National Average:	455		453		445		444		431	

The two university based schools of education are shown in Figures 9-13, attached. The decline in applications, characteristic of the schools of engineering in these same institutions, as shown earlier, can be seen,

followed by a rapid rise in ratio of acceptances, a decline in test scores and finally a decline in enrollment. The first education school (I) (Figure 6) moves to a point of nearly open enrollment in 1973 and 1974, which is also the bottom period in terms of test scores. Test score decline is slightly less steep in the second school (II) (Figure 9) and the ratio of acceptances relatively lower. The acceptance ratio of the two schools are compared in Figure 10 (see Table 11 below for ratios of acceptance).

Table 11

Ratio of Acceptances to Applications, and SAT Scores in
Two Schools of Education, 1969-1975

Year	(I)			(II)		
	Ratio	SATV	SATM	Ratio	SATV*	SATM*
1969	.532	534	551	.398	517	539
1970	.614	526	530	.290	518	541
1971	.833	488	510	.414	539	556
1972	.729	485	510	.581	511	538
1973	.832	450	476	.508	494	505
1974	.917	449	459	.743	488	526
1975	.709	470	494	.548	471	498

*Median scores.

For purposes of comparison with the first school of education, three other academic divisions within that university were also examined. The school of business administration (Figures 14 and 15) reveal the familiar pattern of application decline, rising ratio of acceptance and score declines. Within the school of arts and science (Figures 16 and 17), the pattern is to raise acceptances while applications are falling, beginning in 1971. The test score pattern is similar to those above. Finally, a school of allied health (Figures 18 and 19) shows a substantially different pattern. Applications are rising but acceptances begin to fall after 1974 with the ratio of acceptances to applications rising slightly up to that point. Test scores remain relatively constant.

Table 12 below compares the schools of education, engineering and allied health (see page 48).

Teachers Colleges

The eight teachers colleges included in the study are displayed in composite graphs (Figures 20 and 21). The trend toward declining enrollments and declining test scores is obvious. These data in Figures 17 and 18 are based on test score and enrollment levels in 1970, expressed as 1.0. Test scores in some cases have fallen almost 100 points between 1970 and 1975.

These patterns are compared with nursing programs offered in four of the eight colleges (Figures 23-26). The pattern in nursing is rising applications, falling ratios of acceptance, and falling test scores. The test scores, however, do not fall as rapidly as in elementary education in those schools.

Graduate Programs

GRE test data on quantitative and verbal skills (not subject level tests) obtained from Educational Testing Service shows a distinct separation of test scores by intended fields of study over the period 1970 to 1975. The fields showing greatest score declines include aeronautical engineering, sociology, political science, education and public administration. (The scores, standard deviations and sample size are shown in Table 13 attached.) Those fields in which scores are increasing include mechanical engineering, physics, music, biology, math, chemical engineering guidance. Nursing remains relatively constant. There are 99 designated fields of study which students may check. My analysis includes 26 of the major fields. These data are consistent with the above findings. Test scores are declining in those fields where market demand for new graduates remains weak, and rising, or at least remaining stable, in those fields where market demand is strong.

Table 12

Three Academic Divisions Within One University, Comparison of Ratio of Acceptances,
Applications, Enrollments, and Test Scores

	(1) Applications to Acceptances	(2) Applications to 1968 Total	(3) Net Annual Change in Applications	(4) Net Annual Change in Enrollments	(5) Enrollments in Ratio of 1968 Total	(6) Acceptances as Ratio to 1968	(7) SATV	(8) SATM
<u>SED</u>								
1968	.526	1.00	--	--	--	--		
1969	.532	1.124	--	--	--	--	532	540
1970	.614	1.208	--	--	--	--	534	551
1971	.833	.946	-.074	.089	1.091	1.091	526	530
1972	.729	.838	-.277	-.084	1.006	1.006	488	510
1973	.853	.461	-.128	-.199	.839	.839	485	510
1974	.917	.328	-.818	-.486	.564	.564*	450	476
1975	.709	.301	-.404	-.209	.446	.446	449	459
			-.088	-.125	.390	.390	470	494
<u>Engineering</u>								
1968	.603	1.00	--	--	--	--		
1969	.425	1.153	--	--	--	--	559	636
1970	.527	1.153	.153	-.060	.942	.813	545	655
1971	.795	0.612	.000	-.106	.842	1.007	573	654
1972	.666	0.532	-.469	.033	.871	.806	542	590
1973	.907	0.445	-.150	-.848	.471	.507	507	595
1974	.871	0.874	-.194	.696	.800*	.670	510	615
1975	.775	1.216	.961	.946	1.557	1.261	490	571
			.391	.909	1.414	1.562	481	571
<u>Allied Health</u>								
1968	.632	1.00	--	--	--	--		
1969	.714	1.021	--	--	--	--	524	535
1970	.773	1.097	.021	.085	1.085	1.153	505	545
1971	.830	.962	-.074	.078	1.170	1.340	527	536
1972	.717	1.343	-.140	.058	1.239	1.262	490	519
1973	.887	1.706	.396	.110	1.376	1.524	505	527
1974	.763	1.244	.269	.341	1.846	2.393	482	513
1975	.548	1.521	.371	.317	1.401	1.501	485	513
			.222	.044	1.341	1.318	504	534

*Notes: See p. 12

CONCLUSIONS

From the limited data I have been able to examine, it appears there is a decline in the quality of potential students who intend to study in fields which are undergoing a decline in market demand for new graduates.

The decline in quality appears within the initial pool of potential applicants and then among enrolled students in the first year of study. The size of the pool shrinks as high school seniors and college freshmen shift career choices to fields in a more favorable demand position. (The ACE data on freshmen career choices and the CEEB data on high school career choices corroborate this conclusion. Percentages are dropping in those areas of greatest market weakness and rising in areas of greatest market strength (see Table 14, attached).) For example, the cumulative SAT verbal scores for seniors in high school who indicate they will study education in college is now below 400 (39.7 in 1976). For males choosing education, the mean verbal test score in 1975 was 36.21 and 38.47 in 1976 (CEEb, 1976).^{*} In the ten teacher preparation programs, verbal test scores of enrolled freshmen had fallen from 47.2 in 1970 to 41.7 in 1975. The problem of declining quality can also be seen among the potential applicants to graduate schools. GRE quantitative and verbal scores show a decline over time for indicated fields which are undergoing decline, and rising in fields which are enjoying rising demand. None of this suggests whether declines in quality also characterize those who finally enter an occupation. The data required to address that question are inaccessible. Furthermore, I have not attempted to discover whether present declines are significant declines. Even if verbal test scores decline 90 or more points in education, that may not be perceived to be a serious problem (particularly in light of James McClellan's comments earlier).

It also appears from the limited number of cases that institutions confronted with decline are not simply adopting a policy of benign neglect. There appears to be conscious efforts to raise the ratio of acceptance as

^{*}See Table 15, attached.

applications fall. I am not arguing this is a universal reaction. Indeed, there are apparently colleges which have consciously maintained acceptance ratios in the face of declining applications (Boston College teacher education program being one). However, where the policy has been to accept a greater percentage of those who apply, the tendency has been to "lower standards." Test scores have fallen and in at least one instance the percentage of A's and B's awarded in an educational program remain the highest in that university while its freshman SAT scores are near the bottom. In the cases examined thus far, test scores are seen to be rising in fields of greatest demand or at least not declining as rapidly as scores in those fields of market weakness. It has also been the case that acceptance ratios in those fields are falling.

There seems to be a tendency for fields which require high minimum abilities to respond more quickly to market signals. Engineering enrollments plunged immediately after the bust in engineering in the late 1960's. Education has reacted more slowly, although the evidence seems to suggest a drop-off now in education enrollments. One of the problems all fields may suffer during a correctional imbalance is that the least talented enter the occupation at a time when supply has declined, relative to demand, thus giving employers less choice just when more is needed. This may particularly be a problem for education in the 1980's as an expected increase in elementary enrollments will drive up demand at about the time a reduction in supply has been accomplished. One may assume the reaction in engineering is due to the generally higher abilities of students who choose the field relative to education. However, a study of transfers and student choice, beyond the scope of this effort, would be required to address that issue.

Finally, there are some very powerful issues raised by this study. If quality of those entering education is declining, then the implications for leadership in education are serious. The nature of the educational profession is such that those who assume positions of leadership must themselves have accumulated both experience and credentials within the systems they will lead. From top to bottom, the system is tied together.

The educational professoriate is comprised mostly of persons who first prepared themselves in schools of education, then taught in elementary or secondary schools, or held some sort of position there, then attended graduate schools of education in preparation for college teaching careers. Although the professoriate and the school teachers may not often be commiserative, they need each other. The teachers constitute the pool from which professors of education are drawn and the clients toward which their services will be rendered. Unlike business corporations, leaders in education must come from the profession. Corporate leaders may be lawyers, economists, social psychologists or high school dropouts, but they certainly do not all possess the D.B.A, nor did they all enter undergraduate programs in business administration. To use Thomas F. Green's term, the education profession is involuted. It has to draw its leadership from exactly those who first entered the system through a process of certification and licensure. In short, our next generation of leaders are now entering schools of education. (Since many schools of education have apparently gone to open enrolment, the dismal CEEB test data for seniors takes on more significance. If this group constitutes most of those who will apply, then they also constitute most of those who will be accepted.)

The involuted nature of the educational profession also helps to explain why it has not reacted differently to the education market collapse. Its view of education does not seem to extend beyond the boundaries of the "core" education system, that system which exchanges its credentials and licenses, and maintains the legitimate authority of the profession to make decisions and distribute power.

Although the allocation of resources toward formal learning in business, military, corporate and health care settings has increased enormously since World War II, one would not know that by any significant change in the curriculum of colleges of education; nor would one know it by their recruitment of faculty and students or other functions such as placement. The proof that colleges of education define very narrowly the locus of education in society is evident simply when they have no choice but to shrink any time public school enrollments decline. The public

schools have constituted and will continue to constitute the singular focus of most colleges of education and, consequently, the singular market for their products. Indeed, one observes not only that colleges of education are unresponsive, but that they are also unaccustomed to thinking of broader definitions of education than the public schools. The literature on decline contains few ideas that extend beyond the language of schools and children. There are exceptions such as the University of Vermont, but they are just that: exceptions. Indeed, the literature on enrollment decline is distinguished by a lack of alternatives or any policy responses at all. The few ideas which do occur are primarily those which respond more intensely to the needs of the age-reliant system (e.g., more early childhood and special education teachers, or still more attempts to reproduce those characteristics deemed desirable in teaching children).

The universality of the belief about the single function of colleges of education is further evident in the drop-off of students who major in undergraduate education. What one observes is that the only response to declining public school enrollment and teacher surpluses to date has been individual rather than institutional: a drop in student interest in colleges of education once it was discovered that the public schools needed fewer teachers. The policy of education, on the other hand, has remained congealed in a lack of responsive action of any kind while students "vote with their feet" (Ward, 1975; Imig, 1974). Student action is based on a widely-held belief: if there are no public school teaching jobs, there is no reason to attend a college of education.

NOTES

1. Digest of Educational Statistics (1971), pp. 28-29. See Table 32; Historical summary of public elementary and secondary school statistics: United States, 1869-70 to 1967-68. See Table 32 for other historical data cited in this paragraph regarding school enrollment and average daily attendance.
2. For a detailed discussion of the growth in organized learning outside of the core system of public and regular non-public elementary-secondary schools, and colleges and universities, see: Stanley Moses. The learning force. Working Paper. Syracuse, New York, Educational Policy Research Center, 1970. Dr. Moses has recently updated his estimates for 1974. He now shows that the periphery has reached 72.8 million learners (as compared to 58.9 million in the core) and that resource expenditures now total approximately \$42.9 billion in the periphery (as compared to \$107.5 billion in the core).
3. Statistics of state school systems (1967-68), p. 4. See especially Table B: Instructional Staff, enrollment, and instructional staff per 1,000 pupils enrolled in full-time public elementary and secondary day schools: United States, 1929-30 to 1967-68.
4. Forecasting the 5-13 year old population, as opposed to the 14-17 year old population requires and estimate of the Total Fertility Rate (i.e., the number of children born to a cohort of 1,000 women if they all went through reproductive years exposed to the age-specific fertility rates at a given time). A total of 3.3 million babies were born in 1972, indicating a fertility rate of 2.0 per woman. Demographic forecasts may be wrong, however, even if the total fertility rate process is correct, due to spacing of births. Finally, it should be noted that lacking an explanation of why fertility rates changed in the 1950's, demographers are uncertain how this may change in the future (Morrison, 1976). The current fertility rate is the lowest in U.S. history - less than 2.0 in 1974. It has been argued that this may be a reproductive "pause", representing something akin to a musical chorus taking a deep breath between measures (Sklar and Berkov, 1975). Other analysis yields contrary evidence (Rosenberg, 1976). The most recent Bureau of Census survey of young women suggests a continuation of anticipated family size (2.2 in 1975 from 3.1 in 1960). Several factors suggest at least no abrupt change is immediately likely. One, the pay-offs of remaining in a career increase in a tight job market. Two, a larger potential percentage of working wives will in the future come from moderate and lower SES ranks (reflecting simply the fact that fewer have, in the past, worked relative to upper classes) where fertility rates have tended to be slightly higher. And three, family size expectations of American women are still

- declining. Caution is in order, however, as the largest child-bearing age group of women in American history will characterize the U.S. for the remainder of this decade and beyond.
5. Data from an unpublished OECD report recently prepared by G. R. Austin, Organization for Economic Cooperation and Development, Paris, and presented at the 1973 AERA Conference, New Orleans, La: Contribution of research results to policy-making in education of young children, February 27, 1973.
 6. My analysis, published elsewhere (Weaver, 1977) shows that Federal and state revenue fund allocations to post-secondary education have indeed expanded relative to funds for elementary and secondary education since 1966. At the Federal level, post-secondary funds grew about 124% from 1966-73, while funds for the elementary-secondary schools grew about 85.5%. More instructive here, however, is a comparison of ESEA Title I funds and NEA Title IV funds. The NEA Title IV funds grew 329% from 1968-1974 while ESEA Title I rose only 68%. Any sort of forecast in this area is haphazardous but the political climate did not appear promising to Congressman John Brodemas, speaking recently at an Institute at Boston University. He did not expect any change in the current rate of expansion in ESEA Title I. (British-American Comparative Educational Policy Institute, Boston University, July 1976.)
 7. The reserve pool of teachers is estimated by S. Carroll (1974) as the total production of teachers for the past 30 years, less those employed in the current year. His estimate is that the average job-seeking percentage of this group is about 18.3%. The constancy of the reserve pool, however, probably understates the current condition. First, the pool has swollen with young people unable to find teaching jobs since 1971 and the Massachusetts data (1974) suggest a quite sizeable percentage of those employed in non-teaching jobs still seek teaching jobs or would accept a teaching job if offered.
 8. For every 100 children under five in 1965, there are now only about 78. A span of about 25 years separates the baby boom of post-war and the baby bust in the under 10 age group - meaning that the largest cohort in this half-century is set to teach the smallest. Just the reverse situation obtained 20 years ago as the small depression cohort struggled with the rising baby boom. (That situation will again arise in the 1980's.) The 41 year olds in 1975 represent the valley of the cohort born during the depression years. The peak of the post-war years is represented by the 14 year olds in 1975. The current elementary age group notch, 5-10 year old, bust now in the elementary schools, will be followed by another even smaller notch from 1975-1980 (e.g., children now 1 to 5 represent a still smaller cohort than the current 6-10 year olds (Morrison, 1975)).

9. Personal communication, Martin Frankel, NCES, March 1977.
10. Personal communication, William Graybeal, NEA, March 1977.
11. Already being reported by National Education Association: 14 states reported in 1972 filling a higher percentage of jobs than in 1971 with persons who had higher than minimum requirements for certification. Thirty-eight of the 69 largest school districts reported the same phenomenon. (NEA, 1972.)
12. The declining market for teachers in the post-secondary system will be a natural consequence of fewer students in the 17-21 age group by 1980. This represents simply a shift upward of the contraction now taking place below grade 12. Because the production of teachers is so closely tied to contraction of the K-12 system, the demand for Ph.D.'s and Ed.D.'s for schools of education will be the first area of contracting teacher demand in higher education. However, in all areas of higher education there will be a rapidly declining demand for new teachers after 1975 reaching a point of near zero demand by 1985. The largest potential market for new Ph.D.'s will be the community colleges which now have only a 5.7% Ph.D. teaching force. For detailed discussion see A. M. Cartter (1972), pp. 71-88.
13. NEA Research Bulletin, 1976.
14. Digest of Educational Statistics (1975), Table 87, p. 86.
15. Ibid.
16. Projection of Educational Statistics to 1984-85 (1975), Table 24, pp. 49-50 and Table 25, pp. 52-53.
17. See, for instance, William S. Greybeal, "States and Trends in Public School Teacher Supply and Demand," Journal of Teacher Education, Fall, 1974, Vol. 25, No. 3, pp. 200-208; Dean Corrigan, "Do We Have a Teacher Surplus?" Journal of Education, Fall, 1974, Vol. 25, No. 3, pp. 196-200.
18. See, for instance, Michael Katz, Class, Bureaucracy, and Schools, Praeger, 1972.
19. Ibid.
20. See, for instance, A. Summers and B. Wolfe, "Which School Courses Help Learning? Efficiency and Equity in Philadelphia Public Schools," Federal Reserve Bank, Philadelphia, Pa., prepublication copy (appeared in Business Review, February, 1975); H. Averch et al., How Effective is Schooling? A critical Review of Research, a Rand education policy study, publisher, Educational Technology Publication, Englewood Cliffs, N.J., 1974.

APPENDICES

Table 13

National Sample of Males and Females Indicating a BA+ Degree Preferences or Undecided,
Mean SATVM Cumulative Scores within First Field of Choice for
College Curriculum, Round I, 1975 and 1976, CEB

	CUMULATIVE WITHIN FIELD											
	SATV				SATM				SATV		SATM	
	Males	S.D.	Females	S.D.	Males	S.D.	Females	S.D.	Total	S.D.	Total	S.D.
1975 Bio.Sci.	47.56	10.28	47.52	10.45	52.96	11.49	49.15	11.41	47.54	10.34	51.32	11.61
n =	43.111		32.677		43.111		32.678		75.788		75.789	
1976 Bio.Sci.	45.73	11.28	48.44	11.33	52.31	11.64	50.26	10.64	46.99	11.37	51.36	11.22
n =	24.032		20.841		23.925		20.735		44.875		44.660	
1975 Bus.Comm.	40.76	10.32	38.98	10.58	47.36	11.69	41.63	10.80	39.98	10.47	44.84	11.66
n =	63.018		49.391		63.018		49.392		112.409		112.410	
1976 Bus.Comm.	40.56	10.22	39.46	10.45	47.33	11.99	42.31	11.18	40.04	10.34	44.93	11.87
n =	62.213		57.107		62.212		57.105		119.320		119.317	
1975 Comp.Sci.	44.43	12.68	44.18	11.63	52.99	13.90	48.36	13.98	44.34	12.26	51.27	14.06
n =	9.898		5.852		9.897		5.851		15.750		15.748	
1976 Comp.Sci.	41.87	11.72	40.83	12.69	52.51	13.11	48.26	13.22	41.47	12.06	50.84	13.28
n =	9.994		6.378		9.994		6.485		16.372		16.479	
1975 Educ.	36.21	9.96	41.04	10.12	42.29	10.97	43.14	10.22	39.88	10.28	42.94	10.40
n =	21.181		66.951		21.181		66.955		88.138		88.136	
1976 Educ.	38.47	10.57	40.09	10.22	44.25	11.35	41.93	10.36	39.70	10.32	42.99	10.65
n =	21.161		67.422		21.161		67.422		88.583		88.583	
1975 Eng.	43.61	11.19	47.27	11.50	53.34	11.92	51.88	11.60	43.92	11.26	53.22	11.89
n =	60.358		5.532		60.355		5.533		65.890		65.888	
1976 Eng.	44.61	10.68	48.93	11.98	54.33	11.69	54.00	11.28	44.99	10.86	54.30	11.65
n =	74.760		7.122		74.547		7.123		81.882		81.670	

(Continued)

Table 13: (Continued - p. 2)

		CUMULATIVE WITHIN FIELD											
		SATV				SATM				SATV		SATM	
		Males	S.D.	Females	S.D.	Males	S.D.	Females	S.D.	Total	S.D.	Total	S.D.
1975 H. Med.		45.05	10.70	41.34	9.70	51.47	11.73	44.04	10.46	42.24	10.08	45.85	11.26
n =		<u>35.552</u>		110.603		35.552		110.603		146.155		<u>146.155</u>	
1976 H. Med.		44.86	11.58	42.07	10.58	52.34	12.11	44.13	10.91	42.93	10.97	46.68	11.91
n =		<u>53.172</u>		118.362		53.172		118.362		171.534		<u>171.534</u>	
1975 P.Sci.		48.92	12.53	47.28	12.48	55.83	12.56	51.80	12.50	48.52	12.51	54.85	12.64
n =		<u>20.116</u>		6.491		20.115		6.490		26.607		26.605	
1976 P.Sci.		51.19	11.05	47.58	12.42	58.58	11.08	52.30	13.12	50.36	11.45	57.13	11.85
n =		<u>18.927</u>		5.634		18.820		5.634		24.561		24.454	
1975 S.Sci.		45.04	11.07	45.19	11.09	48.55	11.51	44.87	11.29	45.11	11.07	46.76	11.55
n =		<u>38.854</u>		36.618		38.854		36.617		75.472		<u>75.471</u>	
1976 S.Sci.		45.12	12.31	44.91	11.36	48.69	12.88	44.38	11.22	45.06	11.78	46.49	12.24
n =		<u>32.539</u>		33.710		32.434		33.710		66.249		<u>66.144</u>	

ATTACHMENT #2

Table 14

Intended Fields of Study, Seniors in High School.
National Sample CEEB, 1972-1976

Intended Fields of Study	Percentage				
	1972	1973	1974	1975	1976
Agric.	2.0	2.0	2.0	2.4	2.6
Arch./Env.	2.0	2.0	2.0	2.0	1.9
Art	4.0	4.0	4.0	3.8	3.9
*Bio. Sci.	14.0	12.0	13.0	8.0	4.8
*Bus. & Comm.	9.0	10.0	10.0	11.5	12.6
Comm.	2.0	2.0	2.0	2.7	2.9
Computer	--	--	--	1.6	1.9
*Educ.	11.0	10.0	8.0	9.1	8.7
*Engineer.	6.0	6.0	5.0	6.7	8.4
*Engl.	4.0	4.0	3.0	2.4	1.9
Ethnic St.	0.0	0.0	0.0	0.1	0.1
For. Lang.	2.0	2.0	2.0	1.4	1.2
Forestry	--	--	--	1.2	1.6
Geo.	--	--	--	0.0	0.0
*Health & Med.	6.0	10.0	10.0	14.9	17.9
Hist.	--	--	2.0	1.4	1.6
Home Ec.	2.0	2.0	2.0	1.0	0.1
Lib. Sci.	--	--	--	0.1	0.0
Math.	4.0	3.0	3.0	2.4	2.2
Mil. Sci.	--	--	--	0.6	1.8
Nurs.	3.0	3.0	3.0	2.2	2.0
Phil.	1.0	1.0	1.0	0.7	0.8
Phys. Sci.	4.0	4.0	4.0	2.8	3.8
Psych.	--	--	3.0	3.6	2.0
*Soc. Sci.	17.0	15.0	10.0	7.7	6.9
Theat. Art	--	--	--	1.0	0.6
Trade Voc.	2.0	3.0	2.0	1.4	1.0
Other	--	--	--	1.7	2.7
Undec.	5.0	7.0	9.0	6.5	5.0
Total Samples	548.323	767.903	816.590	812.883	776.065
Elem.					1.7
PE					2.0

(as of 1974-75
includes Journalism

(67.517)

("nursing" as
of 1971-72)

Table 15

National Sample, GRE Verbal and Quantitative Test Scores for Students Who
Indicated a Field of Study, 1970-1975

	1970			1971			1972			1973			1974			1975		
	N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$	
<u>1. National Sample</u>																		
V	293,600	497		293,506	494		290,104	497		301,104	492		298,470	493		295,482	492	
M	293,476	512		293,506	508		290,104	512		301,070	509		298,470	508		295,482	511	
<u>2. Education*</u>																		
V	79,426	490	113	80,024	479	115	86,066	472	115	71,340	468	115	66,467	470	115	62,938	467	117
M	79,384	478	121	79,999	473	123	86,048	468	124	71,341	460	122	66,478	460	122	62,940	460	123
<u>3.</u>																		
V	3,689	509	100	4,673	510	101	5,783	510	100	6,495	506	104	8,606	510		11,191	506	99
M	3,689	461	106	4,673	469	105	5,783	470	108	6,495	473	110	8,607	475		11,190	472	104
<u>4. Aeronautical Engineering</u>																		
V	1,198	512	123	806	493	121	767	477	131	668	486	133	864	465	134	865	475	123
M	1,198	706	73	806	695	80	767	680	89	668	668	87	864	674	87	866	668	96
<u>5. Chemical Engineering</u>																		
V	5,097	438	136	3,646	457	142	4,409	447	132	4,360	434	123	5,344	436	130	5,789	439	132
M	5,098	663	112	3,651	663	111	4,407	673	93	4,379	684	93	5,378	679	95	5,819	683	97
<u>6. Mechanical Engineering</u>																		
V	4,983	418	132	3,558	426	133	3,855	423	133	3,898	417	132	5,344	436	130	5,789	439	132
M	4,983	678	85	3,558	675	88	3,850	669	86	3,911	668	96	5,378	679	95	5,819	683	97
<u>7. Dentistry</u>																		
V	1,439	498	96	1,050	500	97	1,020	520	95	1,098	508	106	1,102	514	102	1,129	507	111
M	1,439	550	39	1,050	562	102	1,020	590	90	1,098	572	107	1,102	570	103	1,129	577	110

Table 15 (Continued - p. 2)

	1970			1971			1972			1973			1974			1975		
	N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$	
8. Medicine																		
V	1,568	<u>555</u>	119	1,691	<u>550</u>	127	2,046	<u>566</u>	130	1,913	<u>570</u>	116	1,971	<u>510</u>	119	1,985	<u>554</u>	119
M	1,571	<u>611</u>	120	1,691	<u>602</u>	120	2,044	<u>608</u>	119	1,913	<u>614</u>	119	1,971	<u>617</u>	121	1,985	<u>607</u>	124
9. Guidance Counseling																		
V	10,596	<u>479</u>	107	12,310	<u>475</u>	110	14,057	<u>474</u>	114	15,487	<u>475</u>	113	15,720	<u>477</u>	111	15,665	<u>477</u>	115
M	10,591	<u>465</u>	116	12,308	<u>467</u>	120	14,049	<u>483</u>	121	15,486	<u>464</u>	121	15,716	<u>459</u>	118	15,646	<u>463</u>	121
10. Physical Education																		
V	5,534	<u>422</u>	93	5,697	<u>415</u>	96	5,797	<u>416</u>	99	5,288	<u>417</u>	97	5,473	<u>424</u>	99	5,282	<u>424</u>	99
M	5,534	<u>458</u>	115	4,697	<u>455</u>	118	5,794	<u>455</u>	117	5,288	<u>453</u>	115	5,471	<u>465</u>	116	6,299	<u>462</u>	118
11. Biology																		
V	13,250	<u>522</u>	121	13,078	<u>519</u>	121	18,946	<u>523</u>	116	21,219	<u>523</u>	117	24,006	<u>527</u>	113	26,041	<u>526</u>	115
M	13,250	<u>500</u>	108	13,073	<u>579</u>	111	18,846	<u>587</u>	107	21,235	<u>585</u>	112	24,031	<u>587</u>	120	26,055	<u>584</u>	111
12. Physics																		
V	10,098	<u>519</u>	155	8,661	<u>521</u>	153	11,596	<u>526</u>	146	12,000	<u>525</u>	143	11,866	<u>527</u>	143	11,987	<u>531</u>	
M	10,090	<u>704</u>	81	8,661	<u>698</u>	83	11,596	<u>701</u>	79	12,003	<u>706</u>	82	11,974	<u>705</u>	87	12,037	<u>706</u>	
13.																		
V	5,835	<u>508</u>	120	5,910	<u>507</u>	117	7,598	<u>514</u>	120	8,469	<u>513</u>	121	9,079	<u>517</u>	120	9,852	<u>519</u>	122
M	5,835	<u>491</u>	123	5,910	<u>497</u>	122	7,594	<u>502</u>	126	8,466	<u>502</u>	123	9,067	<u>507</u>	125	9,851	<u>506</u>	124
14. Chemistry																		
V	12,054	<u>481</u>	142	10,307	<u>483</u>	145	12,978	<u>482</u>	143	14,199	<u>483</u>	141	16,295	<u>485</u>	139	16,985	<u>493</u>	138
M	12,057	<u>654</u>	97	10,307	<u>652</u>	98	12,977	<u>657</u>	93	14,211	<u>665</u>	103	16,512	<u>660</u>	99	16,996	<u>653</u>	102
15. Mathematics																		
V	14,117	<u>522</u>	142	12,443	<u>522</u>	142	14,700	<u>521</u>	142	13,059	<u>531</u>	140	11,499	<u>520</u>	143	11,317	<u>514</u>	149
M	14,114	<u>692</u>	91	12,450	<u>687</u>	97	14,694	<u>692</u>	86	13,081	<u>698</u>	97	11,513	<u>689</u>	98	11,332	<u>683</u>	99

Table 15: (Continued - p. 3)

	1970			1971			1972			1973			1974			1975		
	N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$		N	$\bar{x}$	
16. Law																		
V	1,356	<u>549</u>	135	1,347	<u>529</u>	153	1,345	<u>526</u>	139	1,342	<u>521</u>	144	1,125	<u>525</u>	140	1,302	<u>508</u>	138
M	1,356	<u>549</u>	140	1,345	<u>524</u>	153	1,345	<u>522</u>	139	1,342	<u>517</u>	150	1,125	<u>512</u>	144	1,296	<u>509</u>	147
17. Political Science																		
V	16,627	<u>560</u>	116	15,540	<u>545</u>	118	19,378	<u>537</u>	120	17,933	<u>535</u>	119	16,727	<u>526</u>	121	14,726	<u>525</u>	129
M	16,618	<u>532</u>	118	15,531	<u>525</u>	118	19,378	<u>520</u>	121	17,926	<u>516</u>	126	16,730	<u>510</u>	126	14,739	<u>509</u>	127
18. Public Administration																		
V	3,900	<u>515</u>	118	5,021	<u>503</u>	118	7,561	<u>505</u>	116	8,366	<u>502</u>	114	10,964	<u>499</u>	113	11,534	<u>500</u>	120
M	3,900	<u>528</u>	123	5,019	<u>515</u>	124	7,561	<u>508</u>	122	8,370	<u>520</u>	122	10,964	<u>493</u>	121	11,553	<u>494</u>	124
19. Sociology																		
V	15,020	<u>535</u>	119	14,071	<u>521</u>	125	17,184	<u>521</u>	117	14,180	<u>514</u>	120	13,589	<u>510</u>	121	11,402	<u>504</u>	126
M	15,019	<u>507</u>	122	14,059	<u>509</u>	126	17,197	<u>515</u>	124	14,162	<u>505</u>	127	13,608	<u>501</u>	129	11,421	<u>494</u>	132

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BIBLIOGRAPHY

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FIGURES

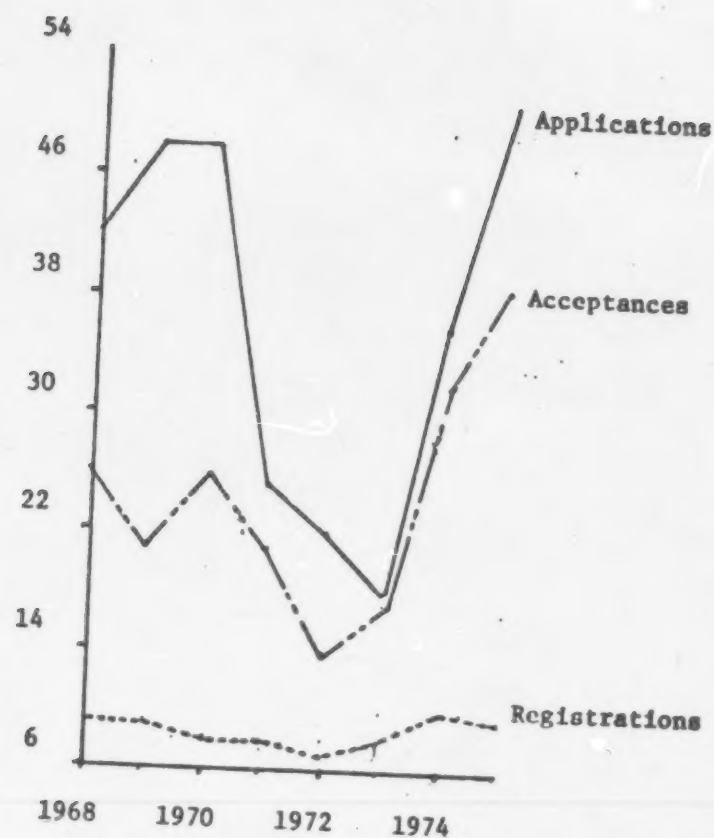


Fig. 1

Applications, acceptances, registrations (converted numbers) of entering freshmen in a college of engineering (I), 1968-1975. Source: Restricted

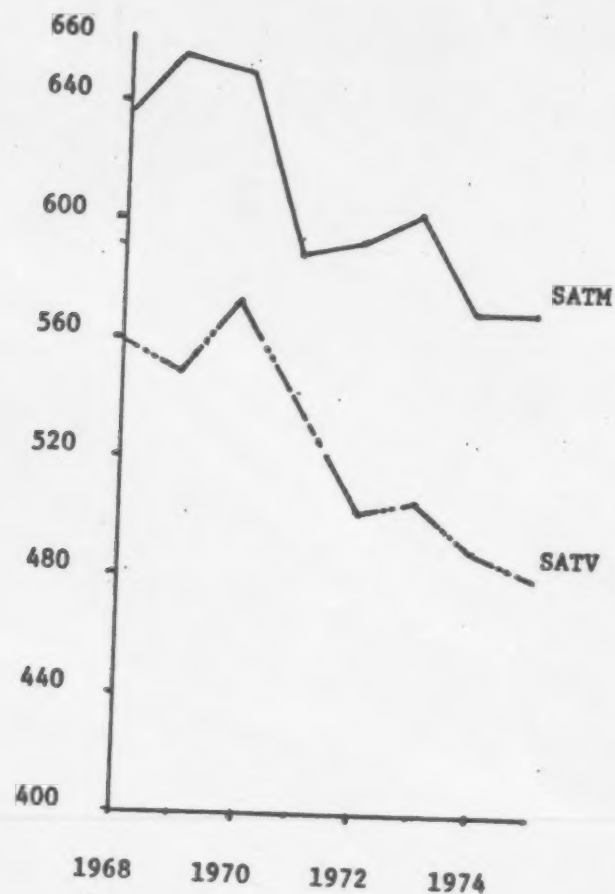


Fig. 2

Mean SAT verbal and mathematics scores of entering freshmen in a college of engineering (I), 1968-1975. Source: Restricted

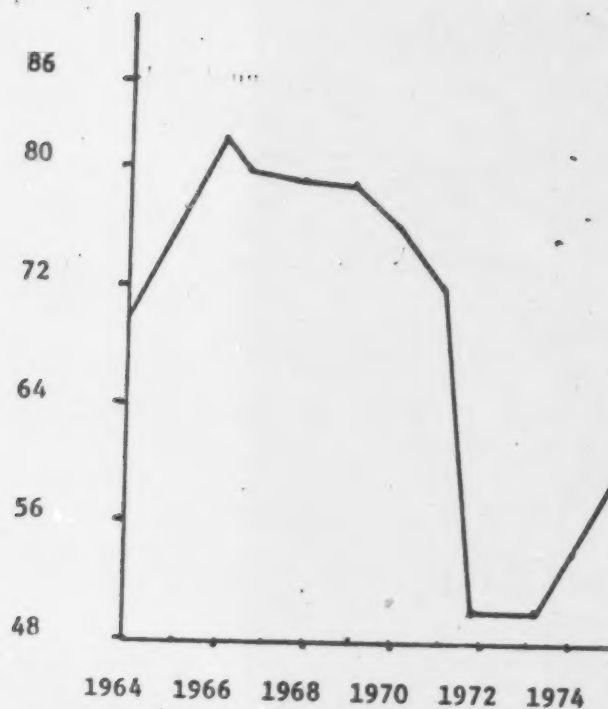


Fig. 3

National BS degree enrollments of first year engineering students, 1964-1976. Source: Freeman (1976).

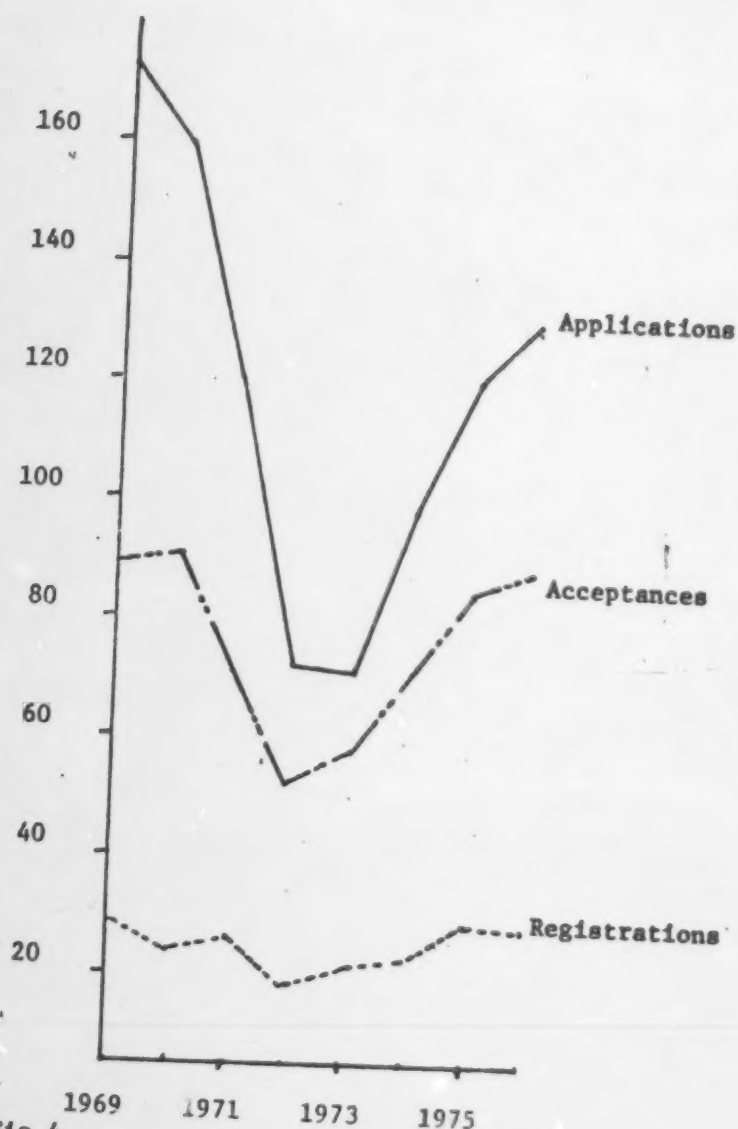


Fig.4

Applications, acceptances, registrations (converted numbers) of entering freshmen in a second college of engineering (II), 1969-1976. Source: Restricted

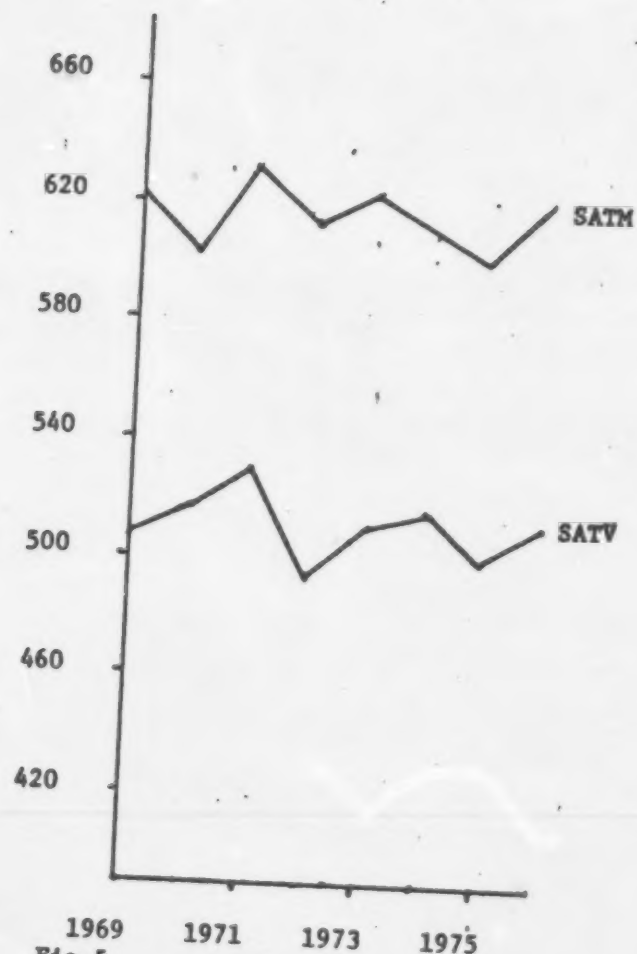


Fig.5

Median SAT verbal and mathematics scores of entering freshmen in a college of engineering (II), 1969-1976. Source: Restricted

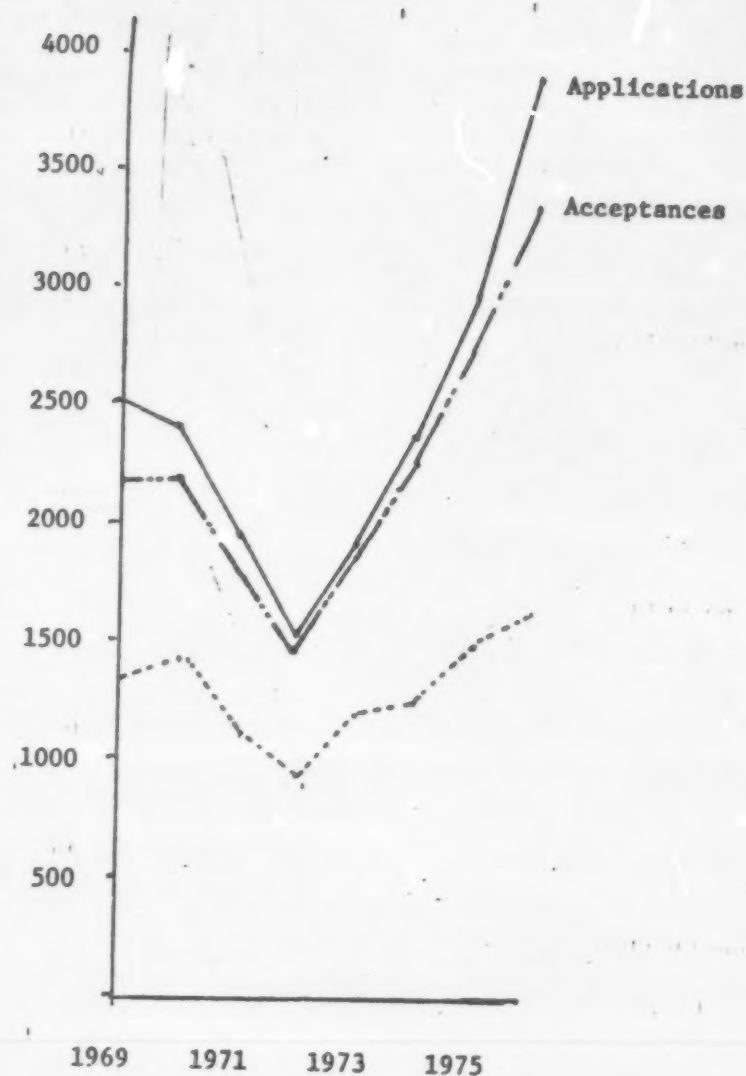


Fig. 6

Applications, acceptances, registrations of entering freshmen (converted numbers) in a third college of engineering (III), 1968-1975. Source: Restricted.

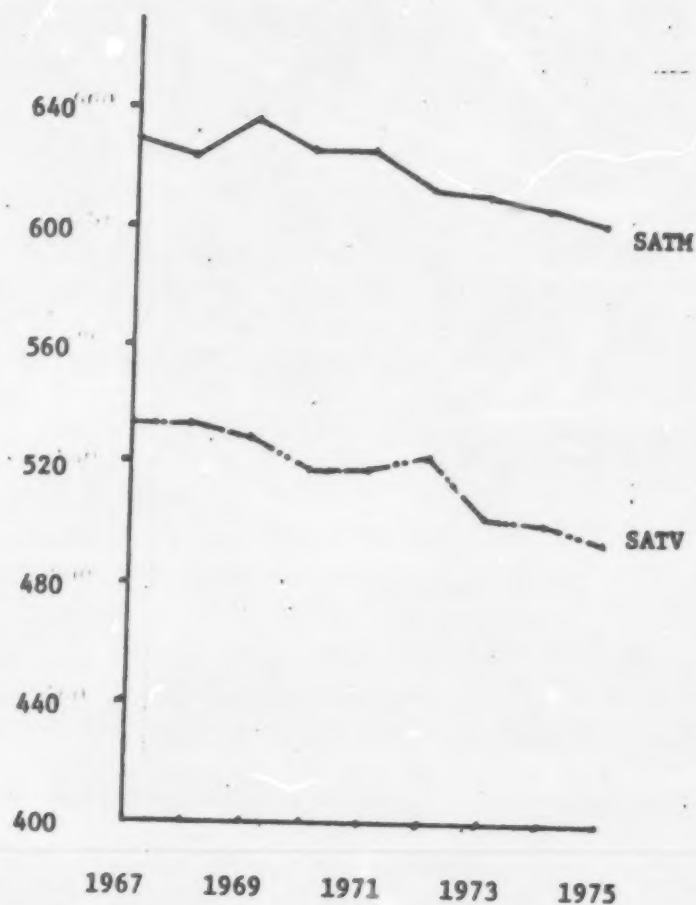


Fig. 7

Mean SAT verbal and mathematics scores of entering freshmen in a third college of engineering (III), 1968-1975. Source: Restricted

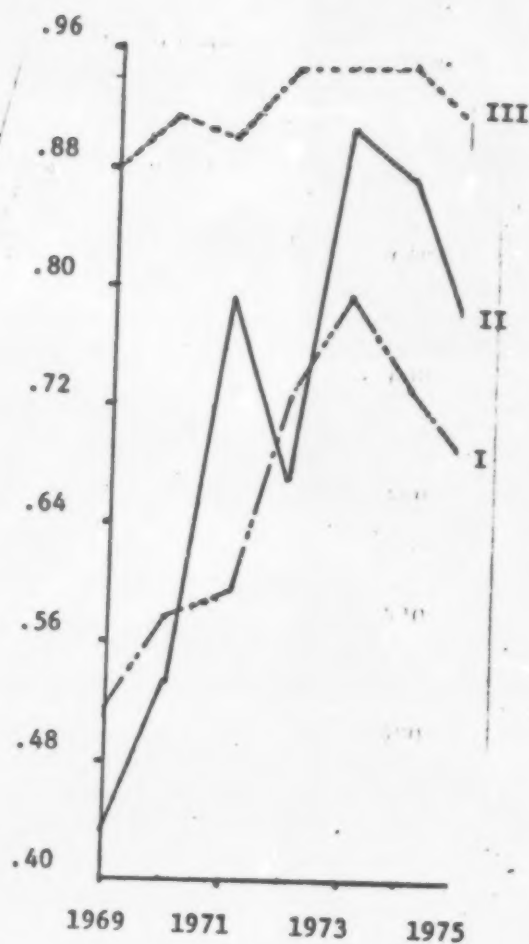


Fig. 8
Ratio of acceptances to applications in three schools
of engineering, 1969-1975

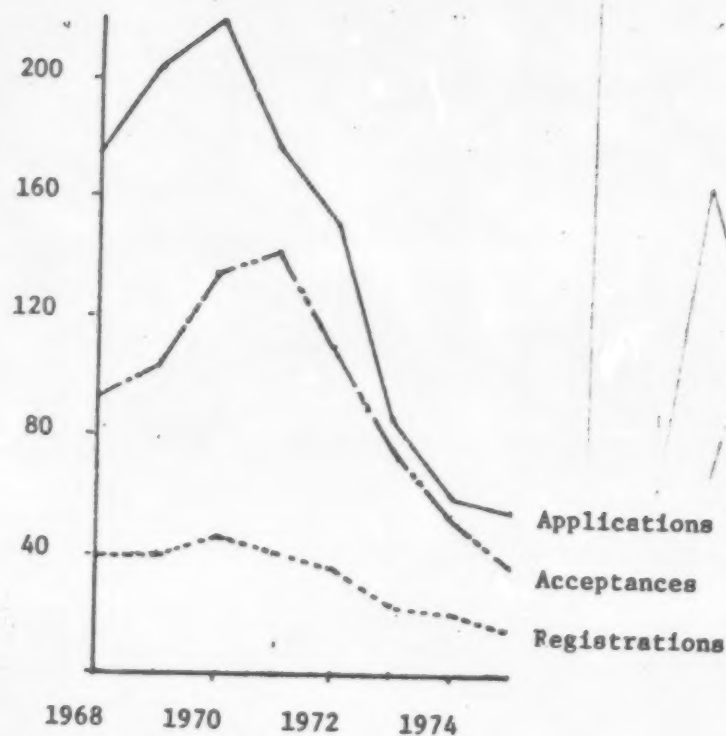


Fig. 9

Applications, acceptances, registrations (converted numbers) in a university teacher preparation program (I), 1968-1975. Source: Restricted

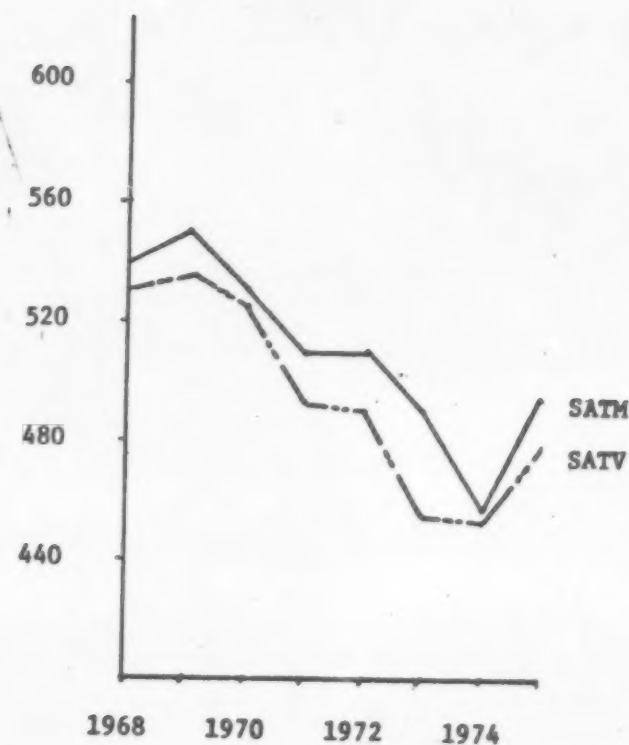


Fig. 10

Mean SAT verbal and mathematics scores of entering freshmen in a university teacher preparation program (I), 1968-1975. Source: Restricted

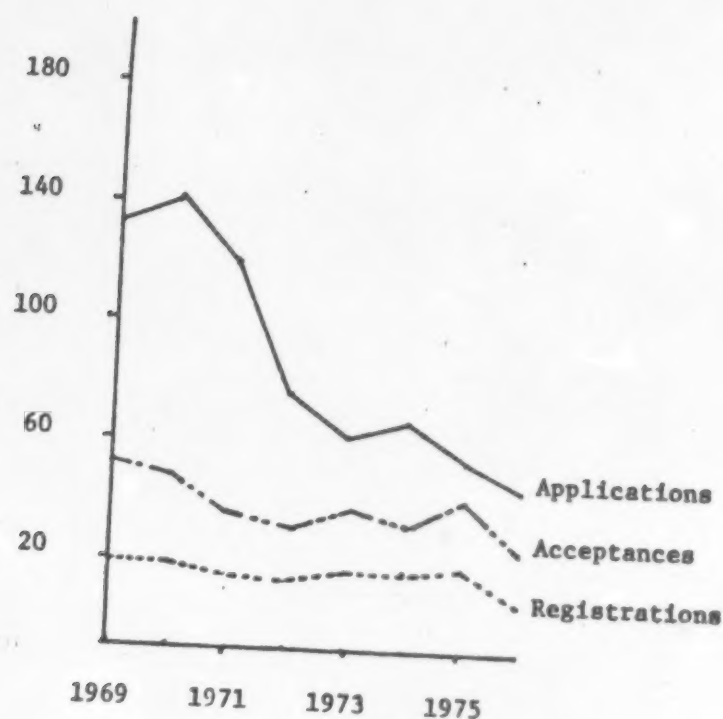


Fig. 11

Applications, acceptances, registrations (converted numbers) in a second university teacher preparation program (II), 1969-1976. Source: Restricted

93

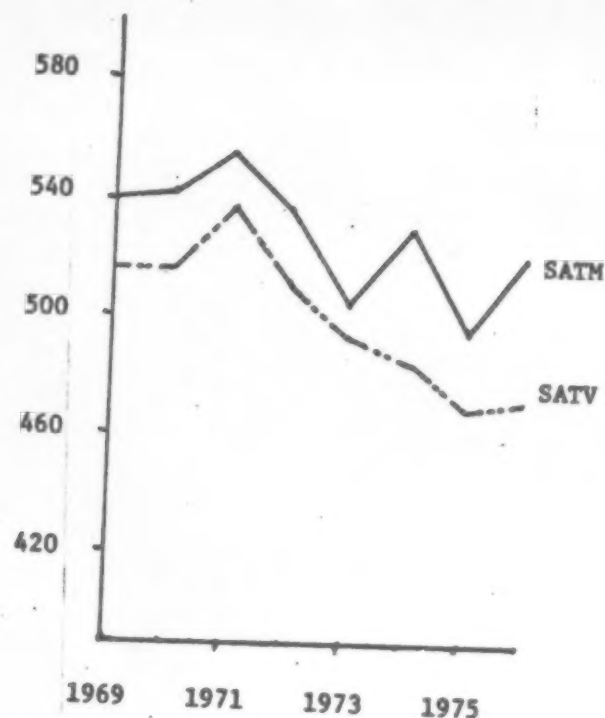
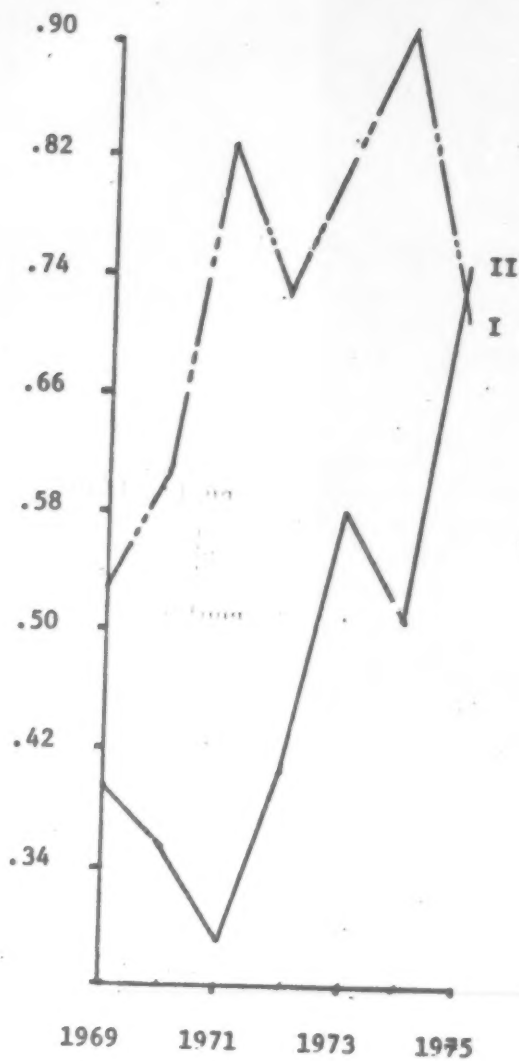


Fig. 12

Median SAT verbal and mathematics scores of entering freshmen in a university teacher preparation program (II), 1969-1976. Source: Restricted

94



95

Fig. 13
Ratio of acceptances to applications in two schools of
education, 1969-1974

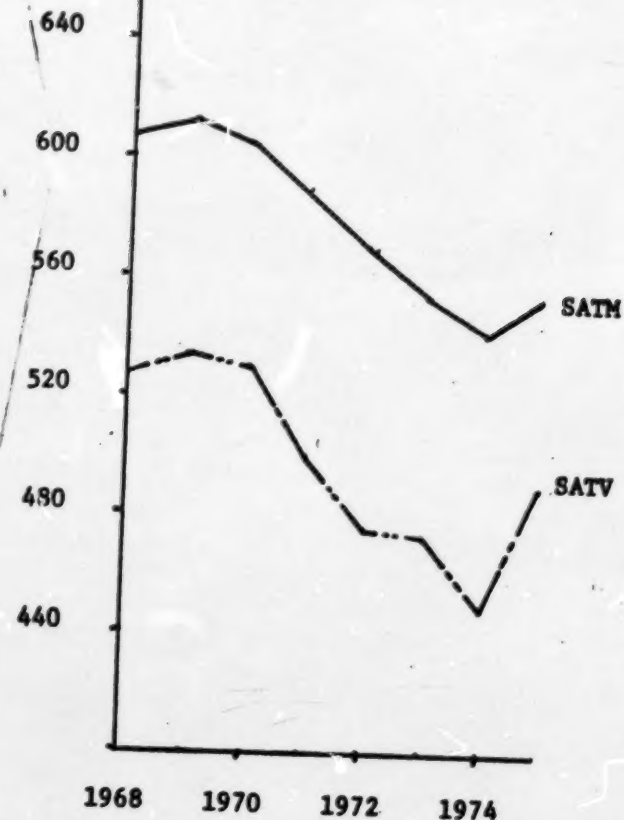
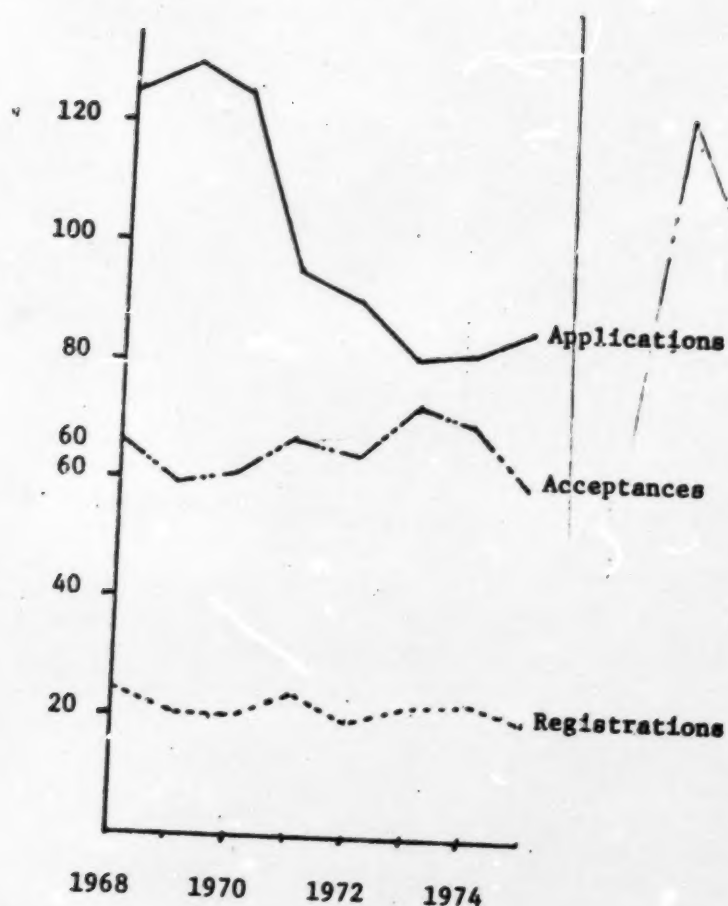


Fig. 14

Fig. 15

Applications, acceptances, registrations in a college of business administration (converted numbers), 1968-1975. Source: Restricted

Mean SAT verbal and mathematics scores of entering freshmen in a college of business administration, 1968-1975. Source: Restricted

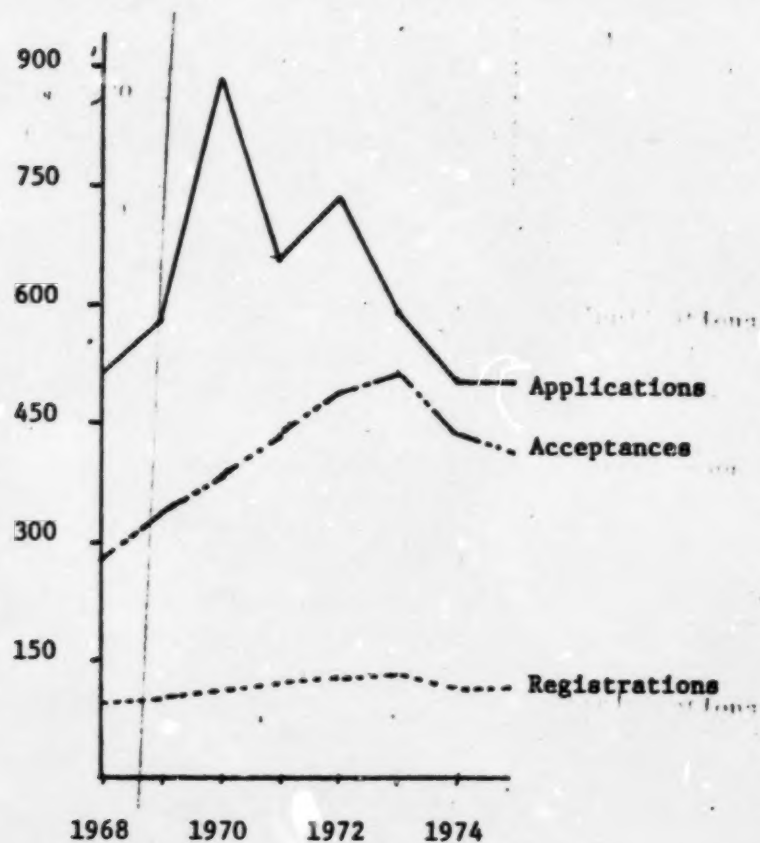


Fig. 16

Applications, acceptances, registrations in a college of arts and science (converted numbers), 1968-1975.
Source: Restricted

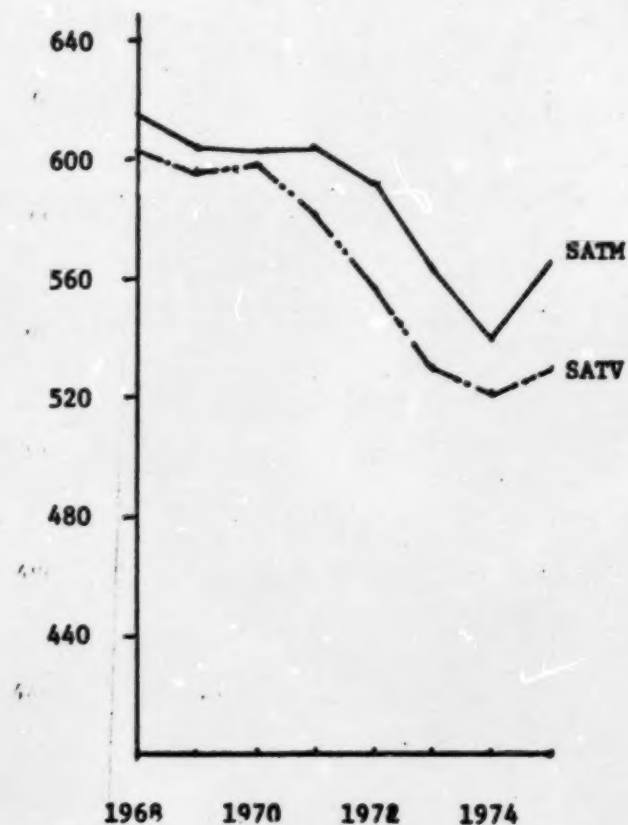


Fig. 17

Mean SAT verbal and mathematics scores of entering freshmen in a college of arts and science, 1968-1975.
Source: Restricted

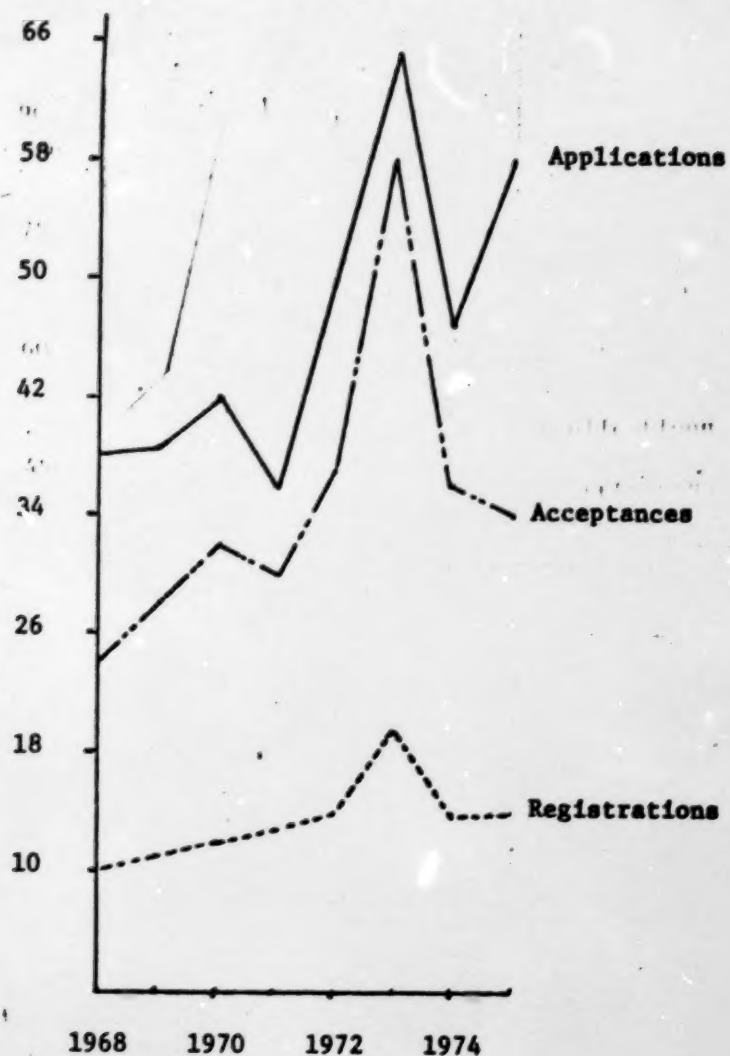


Fig. 18

Applications, acceptances, registrations (converted numbers) in a college of allied health, 1968-1975.
Source: Restricted

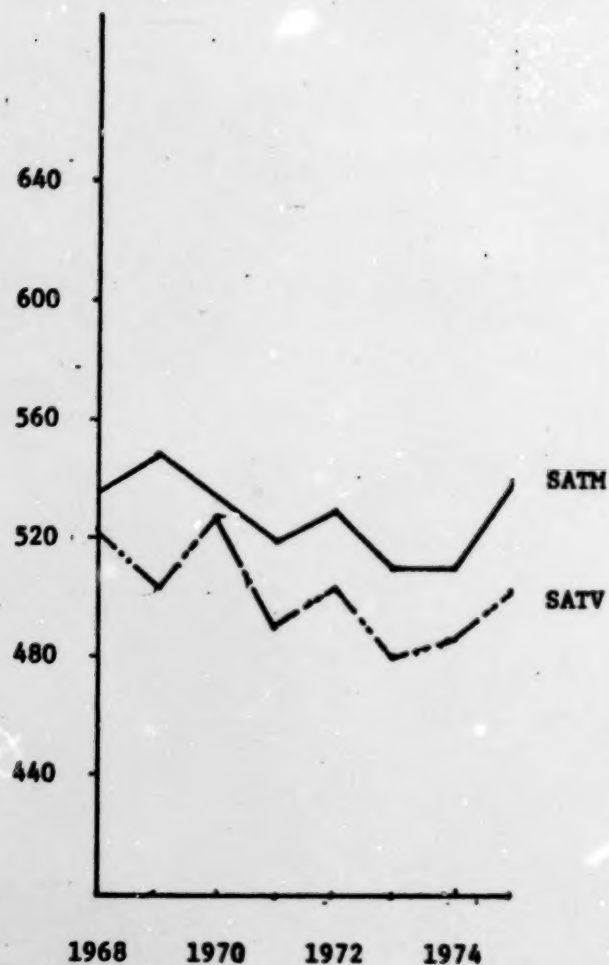


Fig. 19

Mean SAT verbal and mathematics scores of entering freshmen in a school of allied health, 1968-1975.
Source: Restricted

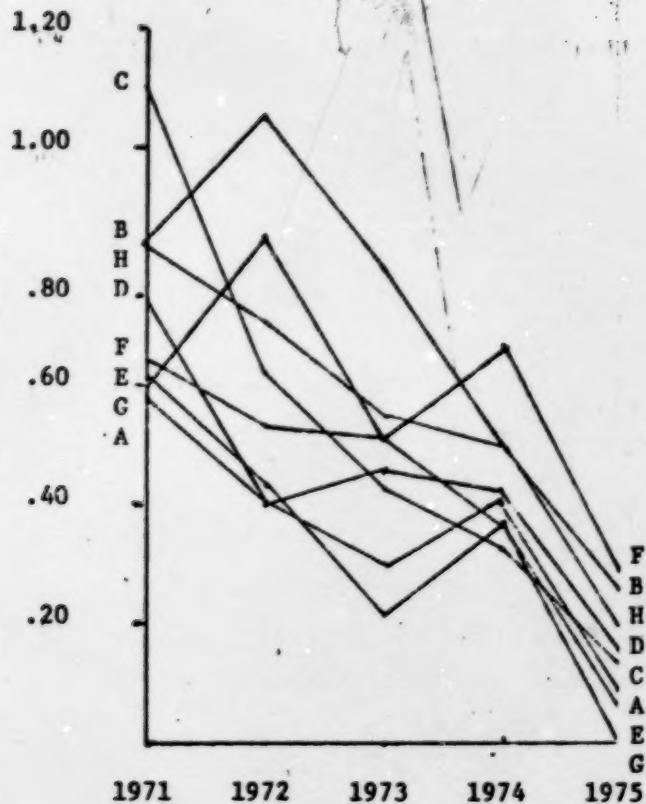


Fig. 20

Elementary education, freshmen enrollments in eight teachers colleges, 1971-1975 (1970 enrollments = 1.0). Source: Restricted

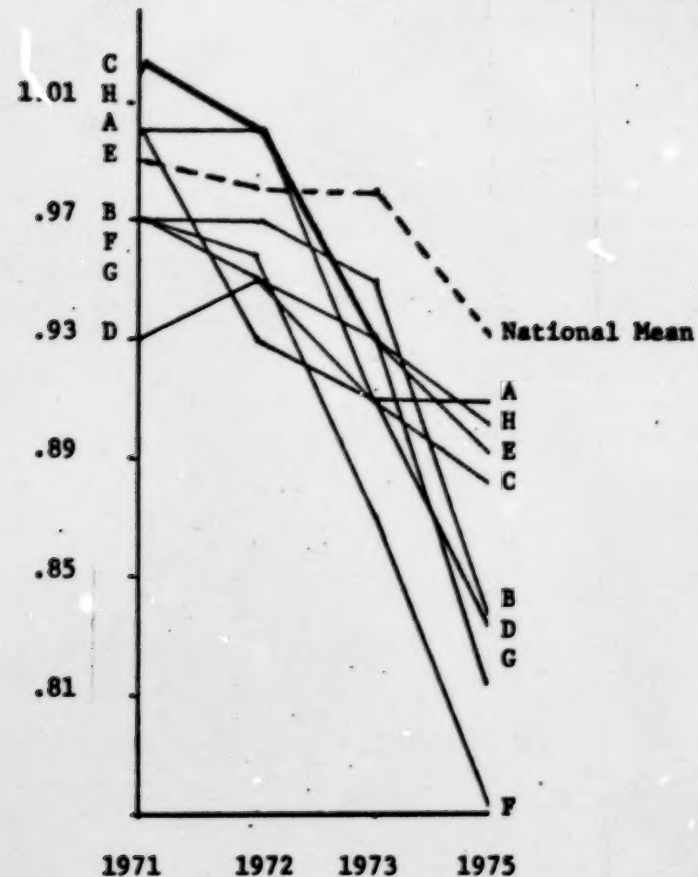


Fig. 21

Mean SAT verbal and mathematics of entering freshmen in elementary education in eight teachers colleges, 1971-1985 (1970 scores = 1.0). Source: Restricted

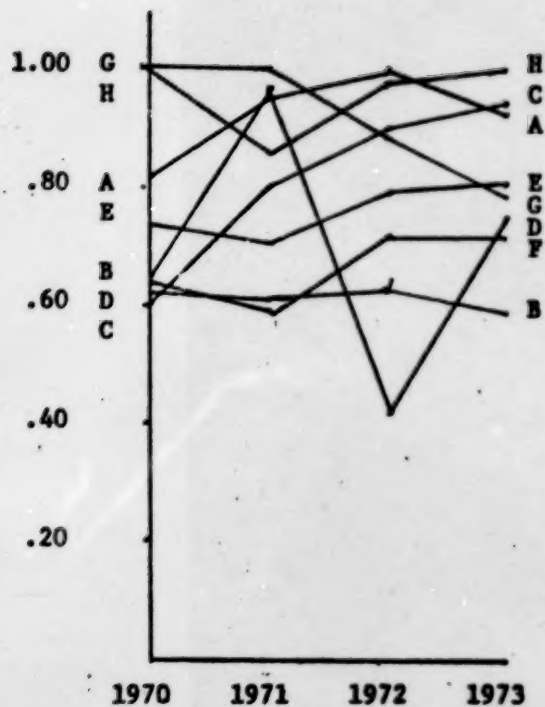


Fig. 22

Ratios of acceptances to applications in elementary education in eight teachers colleges, 1970-1973.

Source: Restricted

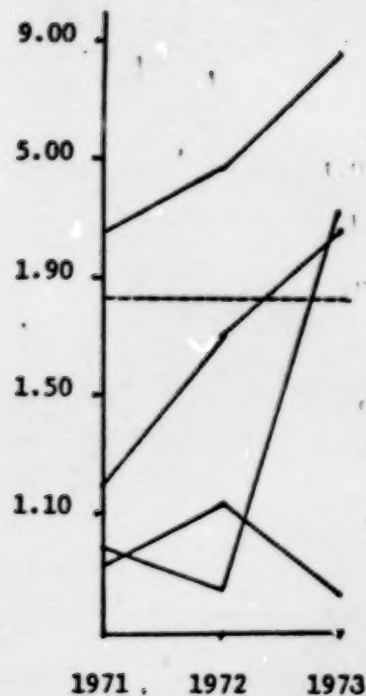


Fig. 23

Applications for nursing (RN) in four of the eight teachers colleges, 1971-1973 (1970 application = 1.0).
Source: Restricted

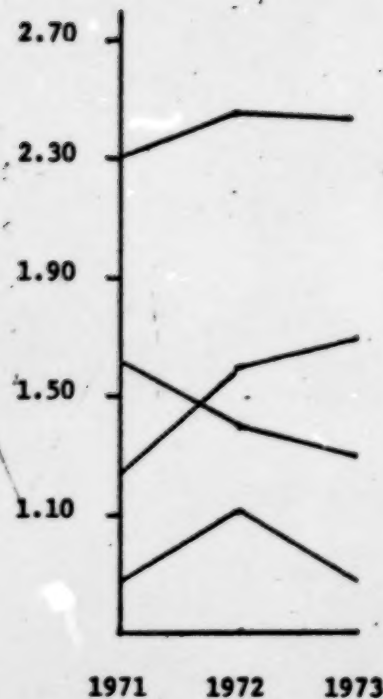


Fig. 24

Freshman enrollments in nursing (RN) in four of the eight teachers colleges, 1971-1973 (1970 enrollments = 0)

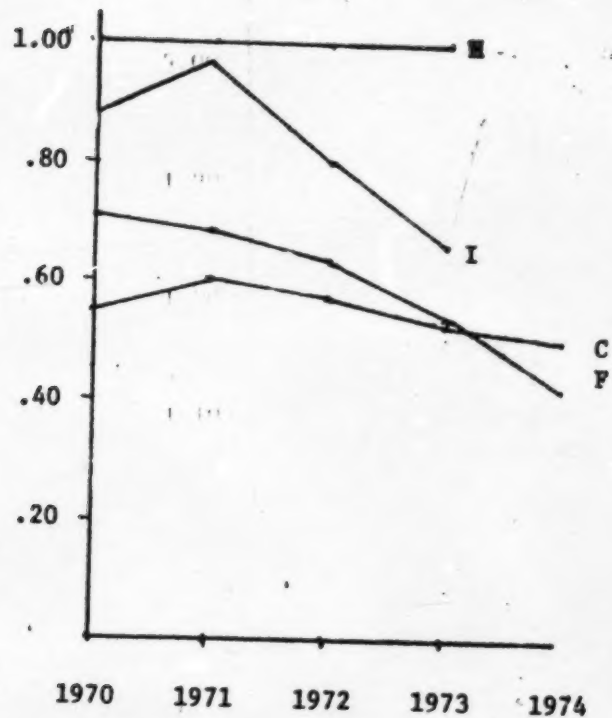


Fig. 25

Ratio of acceptances to applications in nursing (RN) in four of the eight teachers colleges, 1970-1973.

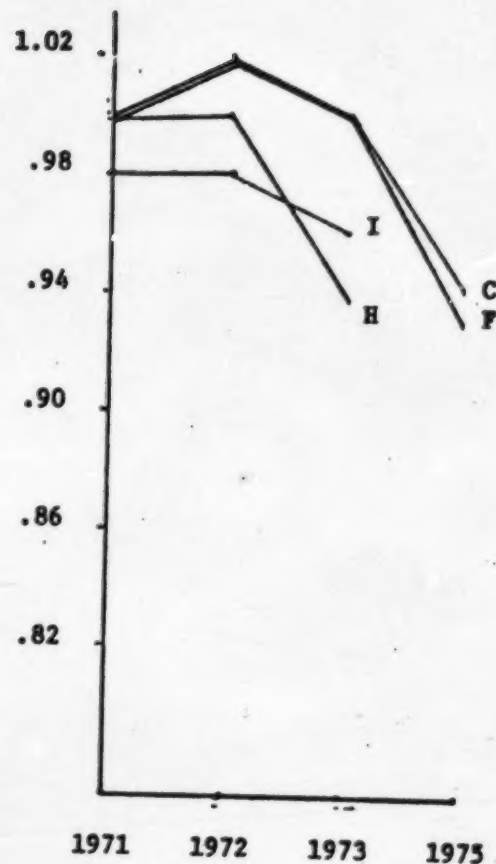


Fig. 26

Mean SAT verbal and mathematics scores of entering freshmen in nursing (RN) in four of the eight teachers colleges, 1971-1975 (1970 scores = 1.0)

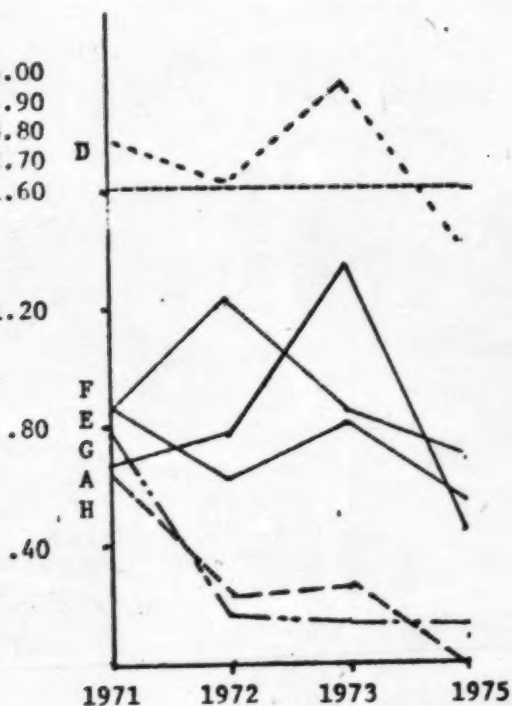


Fig. 27

Enrollments in early childhood education in six of the eight teachers colleges, 1971-1975 (1970 enrollment = 1.0). Source: Restricted.

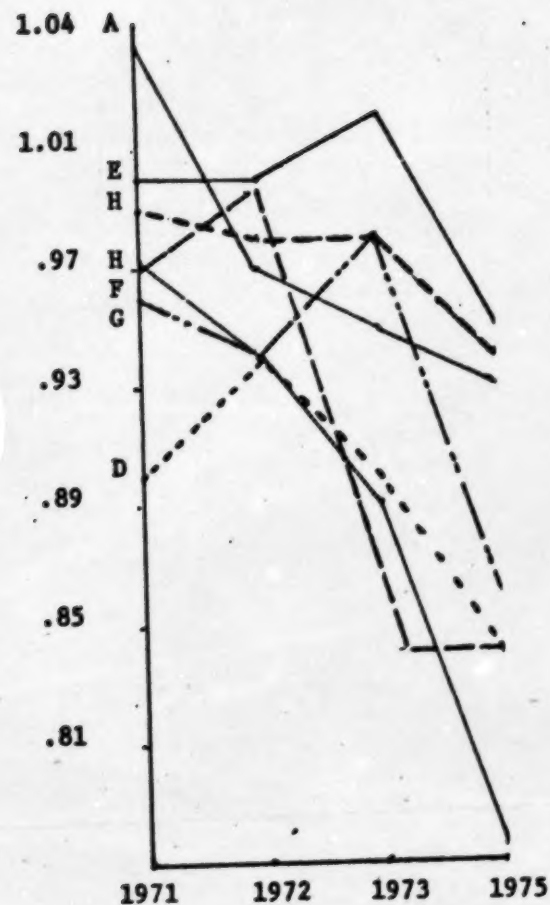


Fig.28

Mean SAT verbal and mathematics scores for entering freshmen in early childhood education in six of the eight teachers colleges, 1971-1975 (1970 scores = 1.0)

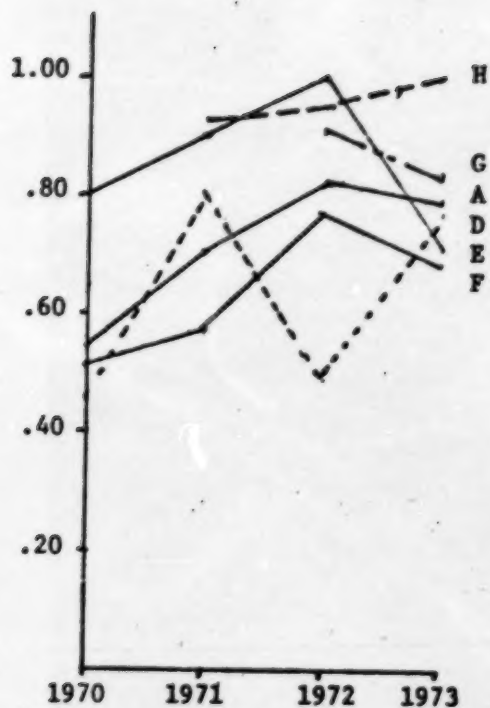


Fig. 29

Ratio of acceptances to applications in early childhood education in six of the eight teachers colleges, 1971-1975 (1970 scores = 1.0). Source: Restricted

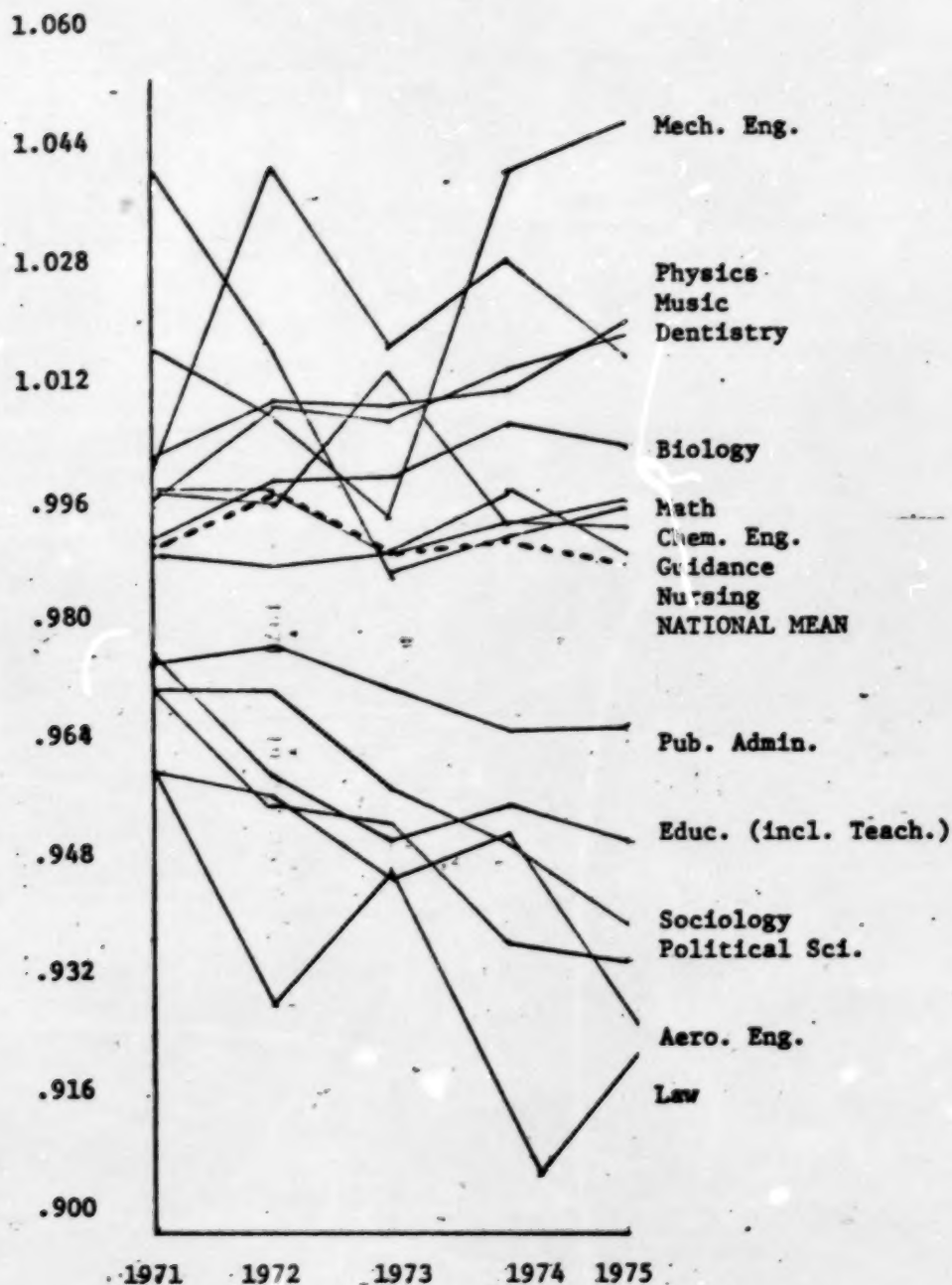


Fig. 30 Mean GRE verbal test scores for national sample of test takers designating selected academic fields (1970 scores = 1.0), 1971-1975

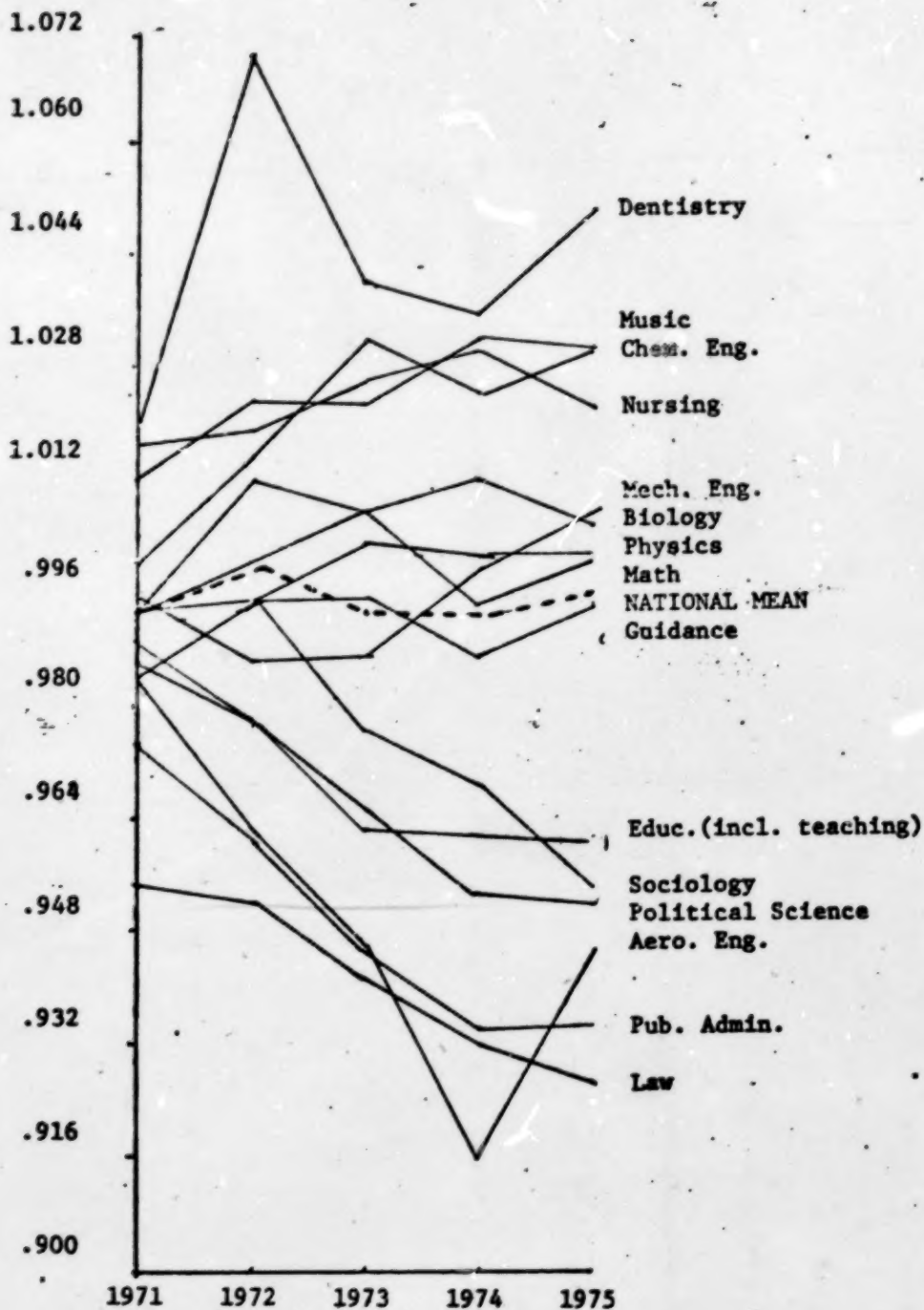


Fig. 31

Mean GRE quantitative test scores for national sample of test takers designating selected academic fields (1970 scores = 1.0), 1971-1975